JULY/AUGUST 1996

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shutters

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Designer Jock Gifford, center, hashes out ideas for the upcoming renovation with Steve Thomas, right, and Norm Abram.

A 109-year-old Victorian on a windswept Yankee island—the next project for Norm and Steve and the team from *This Old House*

SEE PAGE 92 FOR A SNEAK PREVIEW

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CLEVELAND's *Dan Majerle*
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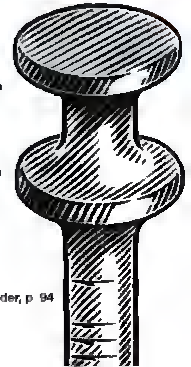
Introducing a new section hosted by This Old House *executive producer Russ Morash. Follow Russ to California to track the development of a new petunia, learn to drive a mini-dozer and sharpen up your spade for a lesson in edging.*



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LEAF PHOTOGRAPH BY J. MICHAEL MYERS; SINK BY JOHN MCMURRAY; EDGING BY KEN FIORETTI; PUMP BY GARY MORIN; NAIL ILLUSTRATION BY CLANCY AMBUSH

Cover photograph of *This Old House* plumbing and heating contractor Richard Trethewey in Sacramento, California, by Gary Moss

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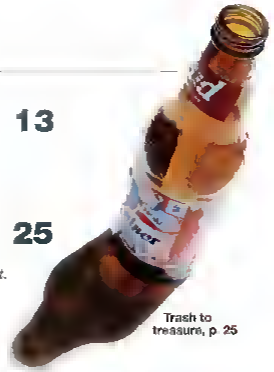

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Visit *This Old House* on the World Wide Web to read about our project houses, view articles online and get up-to-the-minute appearance schedules for the crew www.pathfinder.com/TOH/

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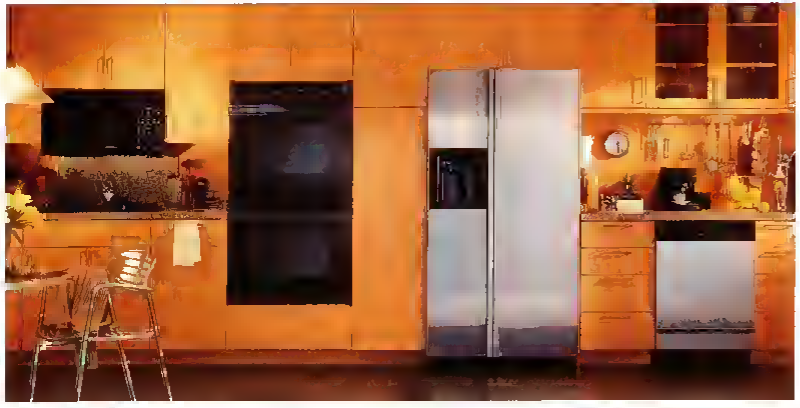

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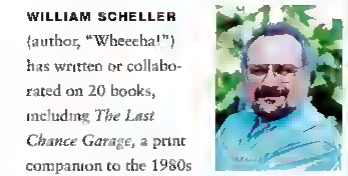
contributors
JULY/AUGUST

WILLIAM SCHELLER (author, "Wheeeha!") has written or collaborated on 20 books, including *The Last Chance Garage*, a print companion to the 1980s PBS series. He lives with his wife and son in Vermont. **TNIBAULT JEANSON** (photographer, "An American Craftsman") has worked for *House and Garden, House Beautiful, Vogue* and *Marie Claire*. He is shooting a sequel to his 1993 book, *The Bed*. **JIM COOPER** (photographer, "Nails") worked as art director for the New York Botanical Gardens before becoming a still-life and interiors photographer. His work has appeared in *House Beautiful, Metropolitan Home, Mademoiselle* and *US*. **JEANNE MARIE LASKAS** (author, "Fence and Sensibility") has written for *Life, GQ, Allure, The Philadelphia Inquirer Magazine* and *Reader's Digest*. She is also the Discovery Channel's online Garden Therapist. Her first book, *The Balloon Lady and Other People I Know*, was published in April by Duquesne University Press.



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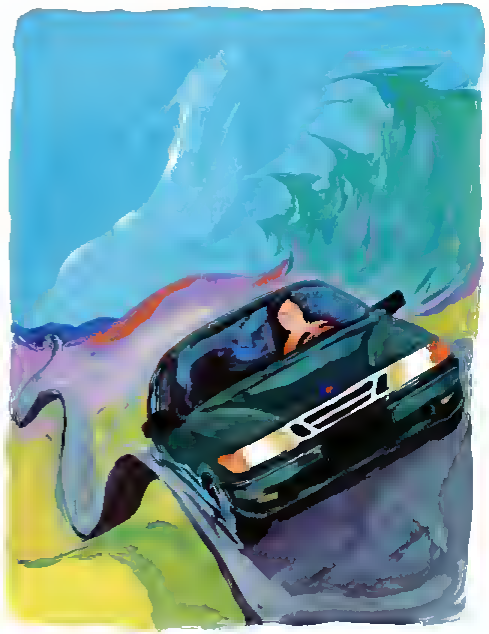
Will your heart pound any less because it's safe? Will your goose bumps care that it's practical?



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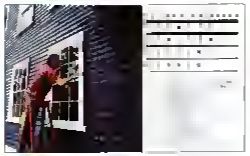
Letters

I enjoyed reading about how Norm Abram fixed those old windows on the Salem house [November/December issue] and wondered if you could help me. My counterweights are no longer attached. Can I reattach them without destroying my windows?



Sharon Sheppard, Riverside, CA

Broken and tangled sash cords are common ailments of double-hung windows. Fixing them is relatively painless. Remove the lower sash by unscrewing one (or both) of the vertical stops that hold it in place from the inside. A weight pocket door, usually secured with a screw, should be in the groove that is revealed. Open the door and reconnect the sash weights. Keep in mind that with the sash raised, there should be three inches clearance between weight and sill.

I would like to have a barn dismantled, moved and reassembled on a site 175 miles away. Who can do it? I'd hate to see this wonderful old structure bulldozed.

Monica Miller, Sedorus, IL

The International Association of Structural Movers (P.O. Box 1213, Elbridge, NY 13060, 315 689 9498) publishes a directory of its 300 members worldwide, and president Carl Tuxill says about 1,200 contractors list themselves as house movers in the Yellow Pages. Because there are no training programs for house movers and no special licenses, Tuxill warns that finding a qualified mover can be problematic. Contractors often lack the appropriate equipment, and estimates vary widely. Pricing is based on square footage, distance, the number of floors and the building material. Obtaining permits and cleaning power lines are additional expenses. Be certain the contractor you hire has already handled a comparable move.

You wrote in your preview issue that four-foot-long cool white fluorescent bulbs would not be available in the United States after October 31, 1995, but I've seen them in stores since then. What happened?

Kris Matilla, via e-mail

Although manufacture and importing of the bulbs did stop as scheduled, retailers anticipated demand and stockpiled them. Lighting companies estimate that supplies are almost exhausted, so if you need 'em, grab 'em.

I just purchased property two miles from the nearest electric pole. What are my energy alternatives?

Bernadine Lennon, Narragansett, RI

Utilities will extend power lines almost anywhere, for a price ($7.95 per foot for a standard installation in your area). Recent studies conclude that sites more than half a mile from existing utility service may be served less expensively by alternatives. In sunny California, for example, photovoltaic cells are a practical choice. Other energy sources include wind turbines and fossil-fuel powered generators, often used as backup in a hybrid system. To get free technical information and referrals, call the Department of Energy at 800-363-3732.

punch list

definition: a list of items incorrectly done or remaining to be fixed on a construction job

- In the May/June Directory, the telephone number for the Isotherm ics heat treatment featured in "Bad Bugs" was incorrect. The right number is 800-873-2912.
- Also in the May/June issue, credits were inadvertently omitted from the bottom photographs on pages 100 and 103. The photographer was Rick Olivier.

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Fence and Sensibility

Never underestimate the power of twisted wire

BY JEANNE MARIE LASKAS

The decision to install an invisible fence around a yard does not happen overnight. One does not just wake up in the morning thinking, "I think I'll bury a green wire around the perimeter of my property that will shock the bejeezus out of my dog." Usually, you go through a learning process. That process involves running frantically around the neighborhood after your dog.

My dog's name is Betty. She's a Lab related mutt, yellow with white paws, who bombarded her way into my heart about a year ago when I visited the pound. I'd been wanting a dog. I had a perfect yard for a dog. Lots of sunny grass to roll around in, a few big shade trees, a sturdy picket fence that stands five feet high. I know, dogs think: Fence, schmence. But I didn't know that at the time.

I brought Betty home. She was a tiny puppy, just six pounds. I put her down in the grass. "Here you go, Betty," I said. "Here is your perfect little dog yard."

Instantly, as if Mother Nature herself had delivered the command, Betty toddled over to the edge of the fence, ducked and squirmed her way underneath, leaving my yard for the great unknown.

I ran after her. Three months later I was still running after her. I kept thinking the problem would fix itself. Betty would get bigger and would no longer fit under the fence. Well, she did get bigger, so she took up digging—and tunneled her way out.

For a while I plugged up the tunnels with bricks. But she would just make new tunnels. Then someone suggested I bury one of those green wires that would shock the living daylights out of Betty the next time she was of a mind to leave. I thought: Isn't that going too far?

The answer is no. I learned this the day Betty was discovered five miles from my house, downtown, in the perfume section of a major department store.

The invisible fence concept is simple. You plug in an electronic transmitter and attach it to the green wire, which is actually an antenna. You put a small receiver collar on the dog. The receiver is sensitive to the signal emitted from the wire. When the dog approaches the wire, the collar sounds a warning tone. If the dog proceeds, the collar sends the dog a small "electrical correction." *Zeet! Zeet!*

Poor Betty, I thought. Until I noticed Betty chewing on the nylon receiver collar. "Betty!" I said. "This is not a toy! This is a $225 pet containment system!"

But Betty just smacked her lips.

So I went to work. Instead of burying the wire, which is

ILLUSTRATION BY PETER ALLEGRO

necessary only so nobody trips over it, I decided to staple most of it along the bottom rail of my fence. For a whole weekend I stapled wire, fed wire and, when necessary, dug trenches and laid wire. Then I decided that as long as I was going to shock Betty out of her wits, I may as well shock her out of my flower beds too. So I began to bury some of the wire near the flowers.

Betty just watched. She seemed to be working on a scheme all her own. Or else she was in denial.

"In order for the signal to work properly," the directions said, "the wire must make one continuous loop." I had one continuous loop around my yard, but I had smaller continuous loops around my flower beds. How to hook these loops together into one continuous loop?

Twisted wire. The directions say that twisting the wire is supposed to help you connect the loops.

A whole weekend of twisting wire went by. Then I plugged in the transmitter, eager to see the little red light of success go on. It did not go on. My loop was not continuous. I considered surrendering.

Meanwhile, Betty was entering an important stage in her development: puppy kindergarten. I enrolled us in this class because we were having some communication problems. I would ask Betty to please stop chewing up all my good shoes, and then I would turn my back and she would go to work on one of the legs of my piano.

Marge was Betty's puppy kindergarten teacher. Marge would bring Betty up to the front of the room a lot and use her as the demonstration dog. And one thing I noticed was that everyone would delight in Betty. In front of everybody Marge would try to get Betty to heel, and to sit, and to lie down. But Betty would just do something adorable and make everyone, including Marge, laugh. Betty was becoming a star. Then one day Marge pulled me aside.

"Betty is smart," she said. "Extremely smart."

"Thank you!" I said.

"It is not a compliment," she said. Having a smart dog is a lot like having a genius juvenile delinquent. Betty, she said, had little respect for authority. Betty acted as if the entire world was put down for her, and what's more, she had the charm to pull it off.

And what does all of this have to do with an invisible fence? The invisible fence brought something new into Betty's life. When I finally got that fence hooked up, Betty got humility.

I ended up disassembling my whole original design. I drew schemes on paper. I made miniature models of my yard in my dining room, trying to figure out how to hook together all the smaller loops into one big continuous loop.

Finally, it worked. The little red light went on. So I followed the training manual, gradually easing Betty into her new life as a dog on the verge of electroshock. I put the half-chewed nylon transmitter collar on her. I walked with her to the perimeter of the yard, where I had placed little warning flags. And I had to stand there and watch as she encountered her very first *Zeet*.

She squealed. She tore inside. She ran under the coffee table and would not come out.

I can't be sure what, exactly, Betty believed to be the source of that shock. But I think she believed the invisible force around her yard was nothing less than Nature's will itself. It was the first thing Betty ever respected. It was the one thing she couldn't charm her way out of.

The invisible fence brought something new into Betty's life—humility

Now Betty had boundaries. And boundaries made the difference. Imagine being a dog. One minute you're sniffing along on the trail of some rabbit and nobody is saying a word. The next minute people are running after you shouting, "Betty, come! Bad dog!" What's the deal? Why were you a good dog a moment ago and a bad dog now? It's confusing. It could make you contemplate the random nature of evil in the world, or put you in a mind to misbehave.

But what if one day the world made sense? Sniff all you want, just don't cross this line. What line? *Zeet*. Oh, that line.

Boundaries calmed Betty down. She would listen to Marge. She would even listen to me. It was almost a happily-ever-after story, until the day I got a knock at the door.

"Your dog got out again," said a girl chewing an impressive wad of peppermint gum. She had Betty by her collar—her receiver collar. Had Betty outwitted the fence? Had she withstood the electric shock while she dug herself an escape tunnel? Had she defied Mother Nature?

I checked the transmitter. The red light was out. "My loop!" I said. I saw something in the far corner of the yard, just beyond the fence. A new tree fort built by some neighbor boys. Pretty nice work. I went over to take a look.

It was held together by green wire.

"My loop!"

The boys had helped themselves. I found them. I explained about the wire. I explained about the dog. I said don't ever, ever touch this wire. I said the dog could get out. They said, "Does the dog bite?"

"No," I said. "But I do."

(See Directory, page 112, for details and sources)

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PHOTOGRAPHS BY DARRIN HAGGAG

A Little Night Light

When heating contractor Rich Bilo got a headlamp last Christmas, his crew giggled and snickered. Headlamps are to heating contractors what pocket protectors are to engineers. But installing the heating system with Richard Trethewey in the unlighted attic of the *This Old House* project in Salem last fall, hands full of tools and fasteners, Bilo soon found that having a beam of light shining wherever he looked came in handy. Electric headlamps are a lightweight adaptation of the helmet-mounted acetylene-carbide lamp—standard mining equipment before the advent of electricity. Carbide lamps are still used by many spelunkers who prefer the pure white halo produced by the long-lasting (but explosive) gas flame. The electric variety, designed for mountaineers and rescue workers as well as builders, remodelers and anyone who climbs around in gloomy spaces, comes with a range of bulbs and power supplies. Halogen, krypton and xenon bulbs cut through darkness better than incandescents but drain power twice as fast. Alkaline batteries warn of their demise with a dimming beam. Lithium or nickel-cadmium rechargeables provide steadier light but cut off with only a little warning. You're more likely to find headlamps in camping outlets or safety supply catalogs than in hardware stores. Before buying one, try it on for comfort with batteries installed. Bilo now considers his an on-the-job necessity.

ABOVE: Sturdy polypropylene case and lens. Good for use in situations requiring a hard hat.

ABOVE: Side-mounting strap holds a small light inexpensive but hard to el

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"A house should—ordinarily—not have a **basement**."
Frank Lloyd Wright

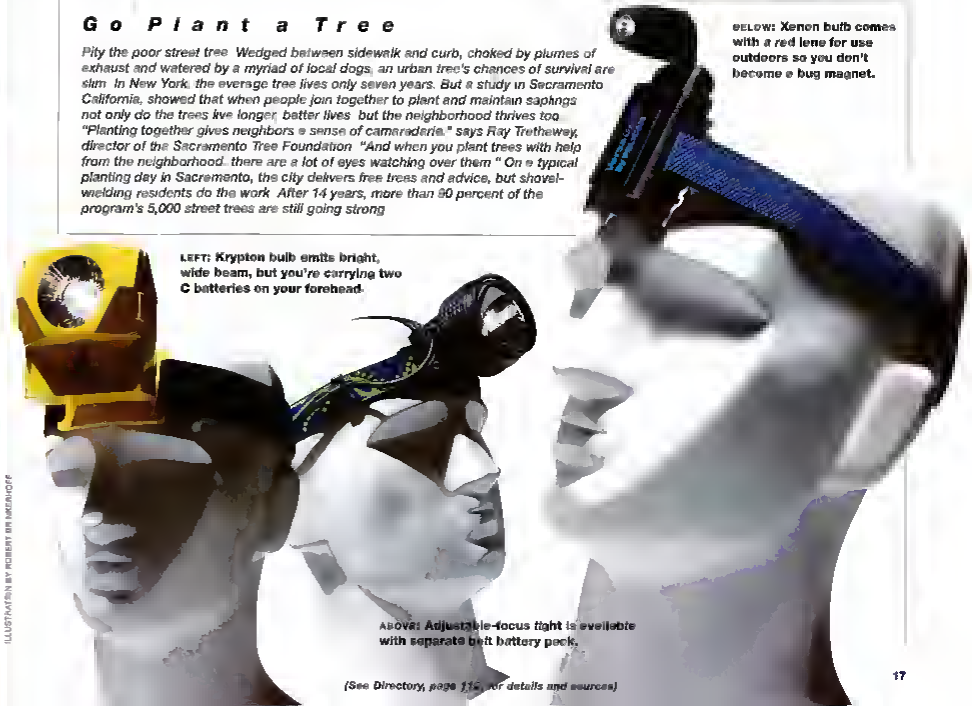
32% 28% 20% 12% 7%

Location, Location, Location

"Homeowners pay more to house their automobile than their children," writes architect James Wentling in his book *Housing By Lifestyle*. Perhaps that's why garages tend to monopolize the exterior of a house. Look at a postwar suburban streetscape. Garage doors—big, flat and featureless—dominate the scene. There are ways to minimize the aesthetic impact by moving the garage around to the back, for example, or presenting it to the street sideways. But, as these results from a recent survey by the National Association of Home Builders show, if given the choice, most home buyers would put the garage in its traditional spot, next to the house and facing front.

Go Plant a Tree

Pity the poor street tree. Wedged between sidewalk and curb, choked by plumes of exhaust and watered by a myriad of local dogs, an urban tree's chances of survival are slim. In New York, the average tree lives only seven years. But a study in Sacramento, California, showed that when people join together to plant and maintain saplings, not only do the trees live longer, better lives, but the neighborhood thrives too. "Planting together gives neighbors a sense of camaraderie," says Ray Tretheway, director of the Sacramento Tree Foundation. "And when you plant trees with help from the neighborhood, there are a lot of eyes watching over them." On a typical planting day in Sacramento, the city delivers free trees and advice, but shovel-wielding residents do the work. After 14 years, more than 90 percent of the program's 5,000 street trees are still going strong.



LEFT: Krypton bulb emits bright, wide beam, but you're carrying two C batteries on your forehead.

BELOW: Xenon bulb comes with a red lens for use outdoors so you don't become a bug magnet.

ABOVE: Adjustable-focus light is available with separate belt battery pack.

ILLUSTRATION BY ROBERT SIE MEINHOFF

(See Directory, page 115, for details and sources)

There's no need to wrap these joints with tape. Spirosafe comes with ready-to-seal rubber gaskets.

Leak-free Ductwork

Unless it's well sealed, ductwork leaks. That means condemned air slips out joints and seams to heat or cool the attic, the garage and other spaces where it isn't needed. Spirosafe is a new round sheet-metal duct-work with integral rubber gaskets that seal joints and stop leaks cold. Suitable for new construction or remodeling, it costs 35 percent more than conventional ductwork—a significant investment. But because home owners can waste as much as 25 percent of their yearly heating and cooling bill on air leaks, the investment may be worth it.

STEVE THOMAS

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August 11 to 13 in Chicago, IL
National Hardware Show

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International Woodworkers Fair at Georgia World Congress Center
770 246 0608

FIRE SNUFFER

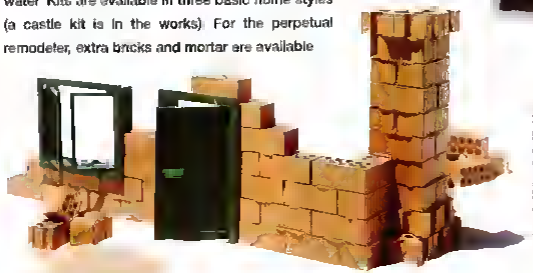
There's nothing quite so frightening as having flames leap up while you're soldering a pipe or sautéing red snapper. You can't get to the fire extinguisher quickly enough, and then, of course, you can't figure out how to make it work. One solution: a Flame-No-More towel impregnated with fire-dousing urea phosphate, the 2-by-3-foot cotton towel is big enough to smother the blaze. The towel does char, however, and can't be used more than once.

Houses as Art

Victor and Bobbie Moore's house is both a sculpture and an ode to junk. Dismembered washing machines, bedposts, motor parts and a complete door and window assembly from a 1952 Oldsmobile are the building materials of choice. The castle in Whitman County, Washington, is a lifetime work in-progress for the owners, who started construction in the late 1960s.

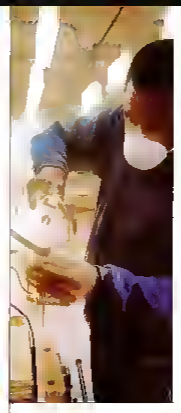
Tiny Terra-Cotta

Playing with these building blocks is easier and a lot more fun than being apprenticed to a bricklayer. Terfoc Brick Building Kits include terra-cotta bricks, roof tiles, doors, windows and even a picket fence. Nontoxic mortar (applied with a mini-trowel) holds it all together. But if you change your mind, the mortar is water soluble—the structure can be razed by soaking it in water. Kits are available in three basic home styles (a castle kit is in the works). For the perpetual remodeler, extra bricks and mortar are available.



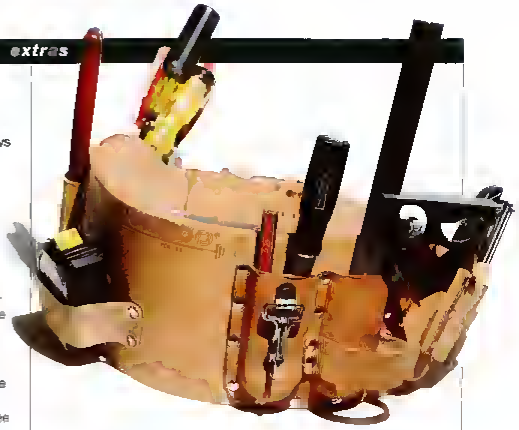
JUNK HOUSE BY L. PINEL TRUAX

(See Directory, page 112, for details and sources)



RENT-A-**SHOP**

Even if there's room in the house, who can afford all the planers, saws and sanders it takes to make a hobby room a real woodshop? That's why there's the Woodworkers Club. Members of the clubs in Boca Raton, Florida, and Vienna, Virginia, get seven-day-a-week access to tools, materials, plans, classes and fellow woodworkers. Storage space for works-in-progress is also provided. Those who have tools and just want a place to work or a chance to use the equipment pay $9 to $12 an hour. For more extensive use of the shop, fees are $24 to $38 each month, plus a one-time initiation fee of $125 to $395.



Tool Cummerbund

Tools belong in toolboxes, where they're secure and well organized. Construction workers have long tried to get around that by wearing them on tool belts, albeit with mixed success. Belts that hang from the waist can be uncomfortable and spill tools when you sit. They also get in the way of a nail apron. Seatek's new Super Belt suspends the tools above your waist and around your back and sides, apportioning the weight more evenly. Modeled on a weightlifter's belt, it also provides back support. Despite the belt's comfort, we found some disadvantages. For one, reaching around to fish tools out of the back pockets takes a little getting used to. For another, you can't safely sit on upholstered chairs.

Paint Wizardry

No cutie-pie "10 tips" book, *Paint Recipes* is a step-by-step guide to colors and finishes for anyone who wants to go beyond merely applying paint to using it as a functional part of interior design. Written by Liz Wagstaff, a former curator at Knebworth House, one of the stately homes in Hertfordshire, England, the book explains the techniques of rag-rolling, sponging, dragging, dry- and loose-glazed brushing and more. Wagstaff fires the imagination with ideas and shares details most of us have been taught to consider trade secrets, and her book is meant to join us in the combat zone, hence its plastic wipe-clean cover.

WOODWORKERS GUILD BY JEREMY DAMERON RAWDON

Square on Steroids

In a world of 4x8 plywood and seamless countertops, small marking and measuring tools often fall short. Not the oversized Super Square, which introduces a level of accuracy that would please an aerospace engineer. The advertised tolerance of the heat-treated aluminum I-bars is just .003 inches per foot or less. Cast aluminum attachments slide along or bolt to the I-bars to make a combination square (shown), a protractor or immense right-angle squares. But be warned: These bulky add-ons don't fit easily in tool belts or boxes, and the entire set, complete with a wood carrying case the size of a coffee table, will set you back $500. For between $30 and $50, consider investing in the 36- or 60-inch I-bar alone. These are ideal for cutting plywood, laying tile, checking walls for plumb—any task where an unwarpable, unbendable straightedge is required.

(Continued on page 22)

Often sedans are--boring.

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a family, the need for room

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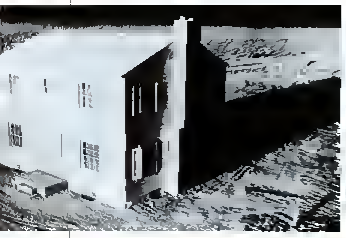
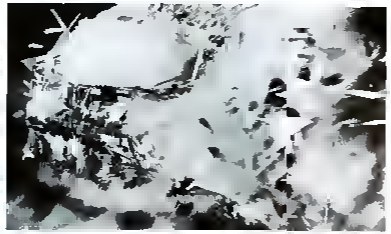
Fasten Your House Belt





Not much of anything will help keep your house in one piece if the Army decides to test a nuclear weapon nearby but in almost any other disaster, a new safety strap can hold your house down. Floods, hurricanes, tornadoes and earthquakes have a tough time moving a structure off its foundation with four-inch-wide Millibar V220 tied in place. The straps are made of Kevlar, a synthetic fiber 15 times stronger than steel and the same stuff used in bulletproof vests. During construction, the builder wraps Millibar over the frame and anchors it to the foundation. Sheathing, siding and roofing go over the straps. A 70-meter roll, enough to fortify a 3,000-square-foot house, costs about $900—a lot less than earthquake insurance.

Events of Interest

■ **LOOKING FOR AN INEXPENSIVE WAY TO BUILD A DURABLE HOME?** Try cob, hand-formed lumps of earth mixed with sand and straw. Cob Cottage Company says a house can be built with the material for less than $500. The company offers seven-day workshops all summer at sites throughout the Northwest to demonstrate the basic principles of producing water-resistant, naturally insulated earthen homes. For dates and locations, call 541-942-2005.

■ **LEARN THE INS AND OUTS OF SOLAR ENERGY SYSTEMS** in a three-day seminar, August 23-25, at the Earth Sweet Home Institute in West Dummerston, Vermont. For information call 802-254-1135.

■ **NEW MORTGAGE PROGRAMS, INNOVATIVE POWER SOURCES** and the latest trends in home building are among topics to be discussed at the 10th annual National Good Cents Conference and Exposition in Destin, Florida, August 21-23. For a schedule of events call 770-921-3425.

Stoking Coal

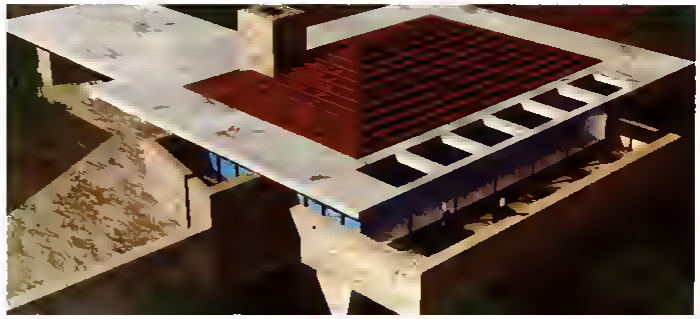
In 1950, more than 30 percent of all houses were heated with coal. Now, fewer than 1 percent are, and for good reason. Coal heat can be dirty, spewing ultrafine soot along with warmth. But the anthracite industry is planning a comeback, thanks to stove manufacturers who are offering cleaner, more efficient units. "Fifteen years ago, we didn't sell domestic coal stoves," says Kaye Tomko, manager of the Cozy Barn in Nazareth, Pennsylvania. "Now we carry half a dozen brands." These stoves burn anthracite coal, a hard, virtually smoke-free fuel, unlike the dusty, sulfur-laden bituminous coal used in industry. To appeal to suburbanites, Blaschak Coal Corp. is washing and packing anthracite in tidy, 50-pound bags that you can "toss into the trunk of your Saab," says company treasurer Daniel Blaschak. At about $5.50 per million BTUs, coal is indisputably the cheapest form of heat (compared with oil and gas at $9 and electricity at $26). Coal stoves burn longer (up to a day) and have a higher heat capacity than wood or wood pellet stoves. On the down side, coal can take an hour to ignite, and you can't just dump its acidic ash into your garden—it poisons the soil.

Swings both ways

Refinement is the difference between a tool and an instrument. After World War II, framing carpenter John Hart developed the distinctive West Coast Framing Hammer. Now Greg Gossage, a framer himself, has tweaked Hart's design to make it fit his needs. The scars on Gossage's hammer showed he spent a lot of time pounding sideways—when toenailing, for example. So he redesigned both standard and California-style hammerheads to do the job right. He leveled, checkered and hardened the cheeks, which are usually angled, smooth and soft. The result is the Gossage Side Strike Hammer, which comes in three head weights (17, 22 and 23 ounces) and three handles (polypropylene-jacketed fiberglass, standard hickory and ax-curved hickory).

(See Directory, page 112, for details and sources)

"If each day you don't **learn** something, you weren't **paying attention**." Tom Silva



Frank Lloyd Wright's All-American House

In 1938, a young couple asked Frank Lloyd Wright to design a house on a budget of $5,500. That would barely pay for a garage today, and it was a modest amount for the famous architect even then. But he accepted the challenge, and the house he produced suited the couple and inspired him so much that, over the next decade, he created 159 similar designs. One of these is now under construction at Taliesin, the Wisconsin estate where Wright had his home and architecture school. When completed, sometime within the next three years, it will be open to the public.

Wright adopted the term "Usonian"—an acronym derived from the United States of North America—to describe the structures, which were both affordable and modern. Fewer than half got much further than his drafting table. (The one under construction is the 59th to be built.)

Ironically, the new house is considerably less affordable. The Taliesin Preservation Commission is still looking for funds to cover its $450,000 price tag. But a good chunk of that will go toward accommodating visitors. If built as a private home, the cost would be between $200,000 and $250,000, closer to Wright's original intention.

(See Directory, page 112, for details and sources)

HOUSE PHOTOGRAPHS BY LIPCHITZ-BITTMANN

ILLUSTRATION BY SCOTT MENCHIN; 3-D RENDERING BY WA KIM

GO MARINE

To preserve and protect exterior doors and trim from the elements without hiding the wood's beauty, take a tip from boaters: Use marine varnish. Also known as spar varnish, this coating's high oil content makes it more flexible than polyurethane, shellac or lacquer. (The best contain phenolic resin and tung oil.) Marine varnish also contains ultraviolet inhibitors, which act as a sunscreen to prevent deterioration of the finish.

How many coats are enough? The owners of mahogany runabouts apply 10 to 12 for a glossy finish, but John Dee, painting contractor for *This Old House*, says three coats are sufficient for [illegible] houses. Upkeep is a must: Depending on exposure, the finish should be lightly sanded every year or so and two fresh coats applied.

TOOL TALES

[REAL STORIES ABOUT THRIFTY TOOLS AND THE PEOPLE WHO USE THEM]

№ 3

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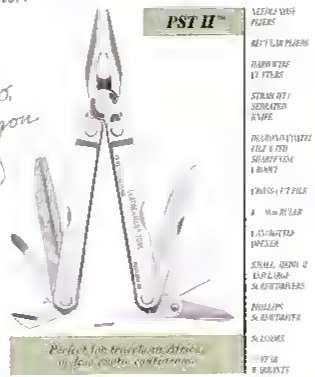

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To Walk on Light

A Seattle dreamer's vision transforms old wine and juice bottles into radiant glass tiles

BY CLAUDIA OLEHN [illegible] PHOTOGRAPHS BY LYNN JOHNSON
STILL LIFES BY DARRIN HADDAD

There is a movement afoot to build clean and green. It's only natural that it flourishes in the lush environment of the Pacific Northwest, where an idea called sustainable building has been embraced as wholeheartedly as the double tall latte. Following their clients' lead, many architects and contractors now use salvaged, recycled, nontoxic materials as a matter of course. And that helps small, low-tech shops like Bedrock Industries turn trash into treasure.

It isn't easy being **green**

Scouring the post-consumer, post-industrial wasteland

Under a misty Seattle sky, wearing leopard-print leggings, a velvet miniskirt and rubber gloves, Mattia Ruano washes and scrapes the labels off bottles saved for her by a local recycler. These bottles, rescued from the trash, are the raw material for Bedrock's unique line of glass tiles.

Ruano is not only chief bottle washer at Bedrock, she is chief everything else too. After graduating from the University of Washington two decades ago, she crewed on yachts, sailing all over the world. In Morocco, she fell in love with terrazzo flooring.

At a bottling factory, Mario Rueno scores a few of the chardonnay bottles she uses for a celery-colored tile. She gets glass from restaurants, recyclers and a tempering plant where, as is typical, about 15 percent of the glass breaks while being heated.

When she settled down back in Seattle, her hometown, she started a business producing terrazzo tiles. In 1989, after two years, she sold out to a large company and later had two children. Still, Ruano couldn't let go of tile-making, or her concern for the environment. "After a while, it just wasn't enough to put the bottles in the recycling bin," she says.

Three years ago she began experimenting with a technique developed by a state employee to make discarded glass into tile. Last year she finally perfected the process. Armed with a small business loan, Ruano headed for the dump.

The Bedrock "trash beautification" factory is in an old, unheated roller rink, shared with a distributor of comic books. Amid 30 tons of crushed glass stacked in frozen food cartons, one of Ruano's three employees strips insulation from old copper wire used to bundle finished tiles. Another worker readies tiles for shipment in boxes salvaged from the comic business. Everything but the tape has been used before.

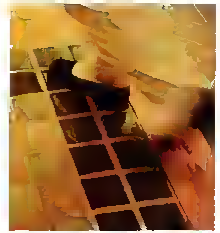
Ruano herself is off on a mission: trash collection. "I have my favorite dumpsters," she says, investigating one outside The Glass Eye, a venerable glassblowing studio in this town that rivals Murano in the art. "This is great trash," she says, bending to pick up lumps of once molten glass. The owner of the studio comes out to tell her that he has saved a barrel of blue castoffs for her. He would rather she take his discards than have them trucked to the dump at $84 a load.

After her prowl, Ruano stops at a hillside cafe for "a cup of the best coffee in Seattle." On the counter sits a basket of small red glass hearts, examples of her lucrative sideline making ornaments. Later, back at Bedrock, she oversees the day's scavenging transformed into objects of beauty. "I'm ramping up to sustain production of 1,000 square feet a month this summer," she says. By contrast, a medium-size tile factory produces 30,000 square feet a month—but, says Ruano, "I have a life." Meanwhile, she feels good, producers of glass waste feel good and customers feel good. "People want to buy a recycled product," she says. "It makes them feel they're doing their bit."

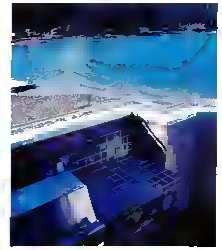
An old skill, but rare

"It's not that it's never been done before—they've been making glass mosaics for centuries in Italy," says Sean Gildea. "But there aren't many manufacturers in the U.S. You can count them on one hand." Oceanside Glasstile, Gildea's company in Carlsbad, California, is one of the few. Shown above are, from lower left, Oceanside's bend-out reeasie, rainbow X tile and blue diamond spiral, the Toltec spiral, from Toltec Architectural Glass, also in California; and Oceanside's Oceanic blue field tile, all made from 95 percent recycled material. The tile molds are formed in clay, then cast in iron and filled with molten glass. The iridescent colors are created with a metallic solution bonded to the front at the tile at 2,000 degrees Fahrenheit. Mike Bastone, who sells these lines at Walker and Zanger in Sun Valley, California, says that the more elaborate tiles are used decoratively with other varieties at tile or slate. Many customers like to use glass tiles for pools. "They're frostproof, hard enough to withstand chlorine, and relaxed with sunlight and water, they're iridescent—just fabulous," he says.

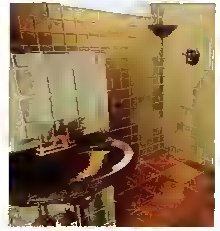
Applications



After two years of hard wear on the floor of Seattle's Pratt and Larsen tile showroom, there isn't a scratch. "It's a labor of love to make something like this, and you can see that in the tile," says co-owner Katherine Blakeney, who sells Ruano's product for about $19 a square foot.

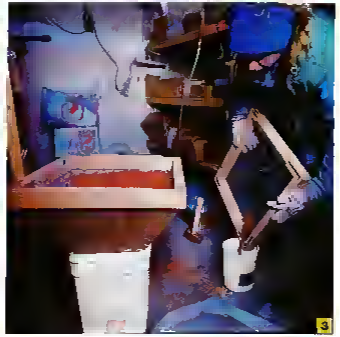


One client used the tiles to line a barbecue area overlooking Lake Washington, in colors to match the blue of its waters.



Architect Robert Harrison installed a sauna and shower using clear tiles. "The owner was after the notion of a luminous cave," he says.

Bashing trash into cash: Bedrock hits pay dirt with a low-tech process



The kilns Rueno designed are fired up, and so are her employees. (1) Bedrock usually processes glass in quantity, but Teresa Verraes and Anna Wiewandt are pulverizing a special cache of hard-to-find red glass with a hammer. (2) After pounding the glass, they screen it to separate the finer particles. (3) Once graded, the glass is ready to be fired. (4) Using a secret process, molds containing the glass are heated to maintain clarity and then carefully cooled—otherwise, Ruano would hold a broken heart.

(Continued on page 29)

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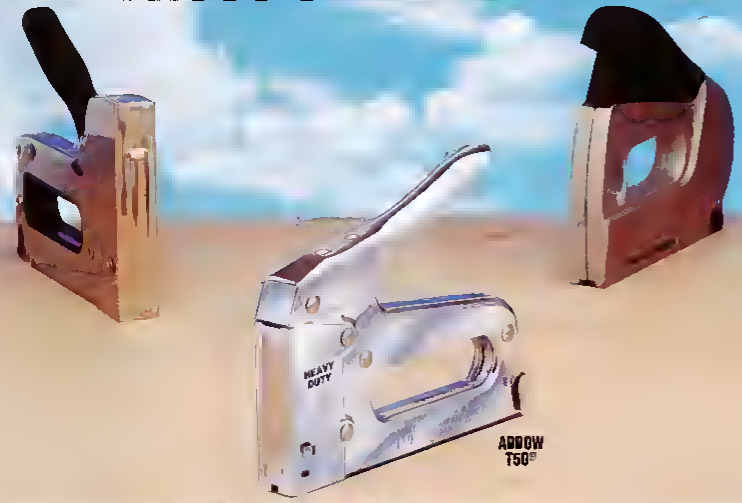

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The Raw Ingredients

Whether a brilliant blue Welsh water bottle or crystalline shards of tempered glass, each starting point yields tile of a particular texture and hue.

Cobalt blue tile is made from Arizona Iced Tea or Welsh Tynant water bottles. Though the bottles look nearly identical, glass from each is fired separately.

Chardonnay bottles give this "celery" tile its hue. Maria Ruano likes names "inspired by the garden," as well as aquatic cognomens: "turtle," "mineral water" and "lake blue." "Pond scum," however, has been gentrified to "pond."

When fired, clear juice bottles create opaque tile, often used for countertops and floors.

Irregularly surfaced clear tile is made from tempered glass A favorite for use in bathrooms, clear tiles are usually bedded in a white Thinset fortified with acrylic Glass tiles are treated like granite, cut with a wet saw and a diamond blade.

After an evening that includes wine with friends, Ruano may use the bottles to fire a special batch of evergreen-colored tiles.

(See Directory, page 112, for details and sources)

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Plane and Simple

Craftsmanship in the palm of your hand

BY JEANNE NUBER PHOTOGRAPHS BY DAVID BARRY

Norm Abram didn't pay much attention to the block plane that came in the Handy Andy toolbox he was given at age 6. But by the time he was 13, "close enough to an adult to look like I belonged on a job," he had begun to realize how indispensable the tool could be. Working as his father's apprentice during school vacations, Norm pulled out the plane whenever he had to shrink a piece of wood just a bit, whether closing up a gap in a miter joint or squaring up a shingle. Then he discovered the low-angle block plane, a sleeker model with a blade that is angled just 12 degrees up from the sole (instead of the usual 20 degrees) to reduce the chance of ripping deep into the wood. Norm kept his old block plane, "but I'd never use it until the low-angle plane got dull, and I'd push it right to the limit. I think every carpenter does." These days, Norm carries only the low-angle plane in his toolbox. "I like the size of it. It slides easily into my tool belt and fits my hand comfortably so that I can hold a piece of material with one hand and plane it with the other."

This low-angle block plane belonged to Norm's father, Louis, who died in December at the age of 70. Louis Abram worked first as a mechanic in a woolen mill, then became a full-time carpenter when Norm was about 7. Besides building other people's houses, Louis built the family home and summer cottage. "There wasn't anything he couldn't do," Norm recalls.

The cutting edge

Norm doesn't bother polishing the sole of a block plane, as some furniture makers do, because one nick from a nail would undo hours of work. But he is careful to polish the back of the iron near the cutting edge, as well as to sharpen and hone the bevel on its front. A blade sharpened only on the bevel side will always be ragged. Below, Norm polishes the back of the iron by holding it flat against a wet diamond stone and rubbing in a circular motion. To hone the bevel, he uses a store-bought rolling jig to hold the blade steady as he pushes it across the stone, making sure to keep whatever angle is already on the blade. A keen edge can shave hairs off an arm, but a safer test is to try it on a thumbnail. A sharp edge will grab the nail, even if no pressure is applied; a dull edge just skids across.

Before Norm sharpened this new iron, the back was rippled with tooling marks from the factory. But after a few minutes on his diamond stone, a mirror finish shines instead.

Better than a sander

Some woodworkers revere their planes, waxing and buffing them until they shine. Not Norm. His 25-year-old low-angle block plane reveals itself as a true carpenter's tool. It's pitted from being used out of doors, even though he periodically buffs off rust with steel wool. The sole is nicked from nails he has hit, and it's cracked from having been accidentally dropped. It's in such bad shape that he recently started using his father's old plane, which he found while rummaging through a toolbox. Even with his large inventory of power tools, Norm still considers this plane his tool of choice for certain jobs. A tuned-up block plane cuts quickly and accurately. And instead of making clouds of unhealthy sawdust, it produces fragrant, curly shavings. "A lot of carpenters don't use their planes anymore," Norm says. "It's a shame."

Norm likes to use a block plane to knock off sharp edges or to chamfer pieces for furniture, especially when he is working with antique wood. "It looks better than the factory-like finish you get with a router." This detailing often extends into end grain, which the plane cuts handily. The tool's name comes from its use in smoothing butchers' blocks, originally made with tough end grain.

A Carpenter's Caveats

- *Planes can be tricky, and you can easily ruin a piece of wood by rushing into action without testing first. Use scrap material to test the blade's sharpness, depth of cut and squareness for the kind of trimming or smoothing you want.*
- *When chamfering end grain, hold the plane at an angle so it cuts down from the board's top face and toward the centerline.*
- *Don't let resin accumulate on the plane or blade when working on softwood. Rub it off with a rag dipped in a solvent such as turpentine or paint thinner.*
- *Set the plane down on its side between uses. Laying it upright on its sole can dull the blade.*

Adapted from Norm Abram's new book, *Measure Twice, Cut Once. Lessons from a Master Carpenter*, published by Little, Brown and Company, June 1996

Parts and Pieces

PHOTOGRAPHS BY SPENCER JONES

Not only are block planes smaller than most hand planes, but their anatomy is different. The blade on most planes is set at a 45-degree angle and cuts bevel side down. A cap iron on top of the blade has to be flattened just right to prevent shavings from clogging the throat. Block planes are more streamlined. The blade, set at 20 or 12 degrees, cuts bevel side up, like a chisel. Shavings fall away easily without any need for a cap iron.

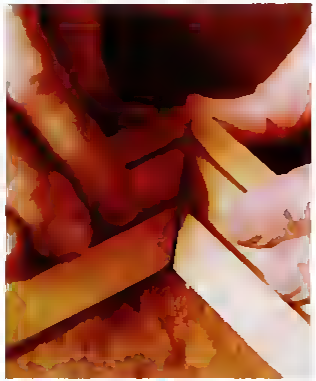
Lock lever swings right to hold parts tightly together, left to allow disassembly.
Lever cap holds blade in place. Cap screw fits into keyhole.
Blade, or iron, is placed bevel side up.
Knob secures lever that adjusts opening in the sole. Deep cuts require a wide opening so shavings slide through; fine cuts need a narrow opening to prevent tearing of wood.
Knob moves blade forward and backward, setting depth of cut. Some planes have a lever to adjust blade skew.
Dog engages one of the slots in the iron.
Cap screw controls the pressure holding parts together. Pressure should be just enough so parts don't slip when the lock lever is tightened.
Sole.

finessing joints and edges

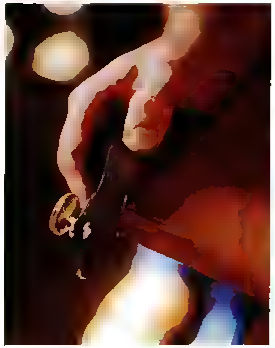
With its built-in protection against cutting too deeply, a block plane is perfect for jobs that require fine-tuning. The trick is to take wood grain into account when positioning the tool.

Fitting Corners

Cutting a perfect miter isn't easy. The slightest error is doubled when the pieces are mated, and if the surface underneath isn't flat, problems can multiply. For small gaps, Norm avoids using a saw to shave off excess wood. "There's not a tool that can do it better than a block plane," he says. If the gap is on the inside edge, as it usually is, the remedy is to trim a bit from the outside tips. Norm finds it impossible to plane from the tip down, that goes against the grain. He can't plane from the inside up because that would cause the outer edge to tear. Instead, he planes front to back, holding the tool on a diagonal, to preserve a crisp edge.



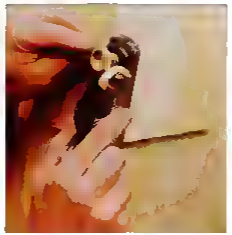
Trimming Edges



Because a block plane can cut both with the grain and across end grain, Norm uses it to trim a stile-and-rail cabinet door. Planing with the grain of the stile requires little experience, but trimming the tops and bottoms takes skill. At far left, Norm shows what happens if the blade is pushed to the edge at end grain. The wood splits off. To prevent this, he turns the plane around and trims the top rail by pulling the plane toward him. He cuts just the first few inches this way, then flips the plane and finishes the edge by pushing away. When trimming end grain, he angles the plane because the wood shaves more easily. "If you do it at a skew, you're not going right up against that grain." He also finds holding the plane at an angle more comfortable.

Shaving Shingles

Number one on Norm's list of uses for a block plane is trimming wood shingles that are used for siding. Where two shingles meet at a corner, he'll get busy with his block plane to make the edge of one shingle fit the slope of the other. Common irregularities, such as out-of-square shingles, are also easily remedied with the tool. Norm just shakes his head when he sees roofers using electric sanders or grinders on shingles. "They make too much dust," he says.



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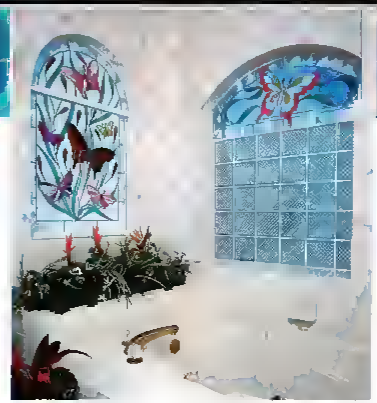

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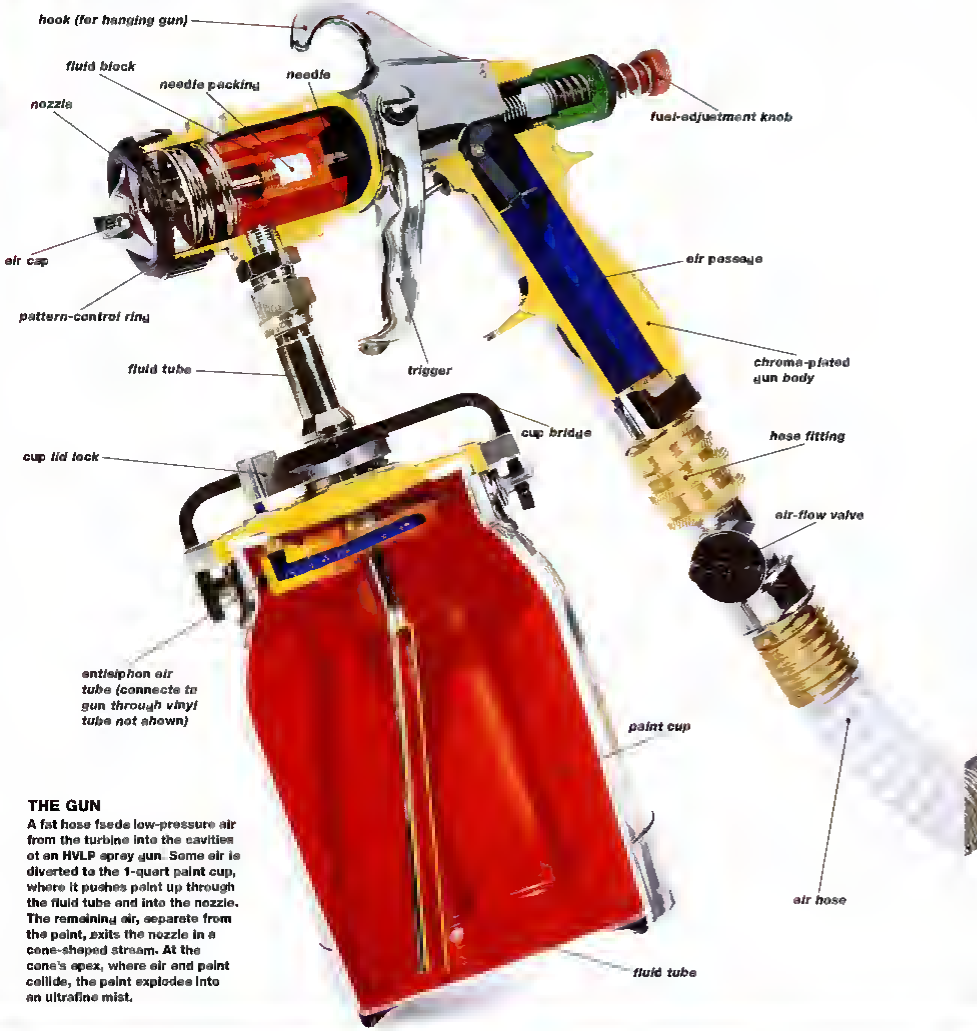
Mist ain't behaving? New low-pressure systems change everything about painting

BY MARK FEIRER **PHOTOGRAPHS BY KELLER & KELLER** **STILL LIFES BY SPENCER JONES**



THE GUN

A fat hose feeds low-pressure air from the turbine into the cavities of an HVLP spray gun. Some air is diverted to the 1-quart paint cup, where it pushes paint up through the fluid tube and into the nozzle. The remaining air, separate from the paint, exits the nozzle in a cone-shaped stream. At the cone's apex, where air and paint collide, the paint explodes into an ultrafine mist.

Spray-painting usually prompts images of pressurized cans with cheap plastic valves and noxious fumes, or paint-encrusted auto-body guys generating fog banks of colored mist. Spraying a mailbox isn't quite like doing up a Lincoln, but the two systems are surprisingly similar. Both harness compressed air to atomize paint and create a thin, even film unblemished by brush marks. "Problem is," says *This Old House* painting contractor John Dee, "you'd better mask, move or cover anything that's nearby, because most of the paint will be lost." That's why, when it comes to putting a slick finish on cabinets or woodwork, Dee uses a high-volume, low-pressure (HVLP) system.

Unlike compressor-based systems that move up to 15 cubic feet of air per minute at pressures of up to 175 pounds per square inch, an HVLP system uses

Dee's deluxe HVLP system features a 2.5-gallon pressure pot (atop the turbine), big enough to hold an open can of paint. This option increases capacity, reduces cleanup and refill time and lightens the spray gun—an important consideration when spraying overhead.

HVLP sprayers are used not only for painting ***cabinets*** *and* ***cars*** *but also in* ***tire plants*** *(to spray release agents into tire molds) and in* ***shoe factories*** *(to spray tanning chemicals onto leather). Ever wonder how the sugar coating gets on* ***fortune cookies?*** *Yep, HVLP again.*

THE TURBINE

Like a vacuum cleaner running in reverse, an HVLP turbine delivers lots of air at low pressure as soon as you turn it on. (Compressor-driven sprayers must build up air-tank pressure first.) Turbines come with 2- or 3-stage impellers, or fans. Three-stage models generate more pressure and move thicker paint. Two air filters on this turbine prevent dust from being sucked in and mixing with the paint. Solvents sucked into the turbine may cause an explosion, so for safety, the turbine should be kept 20 feet away from the gun.

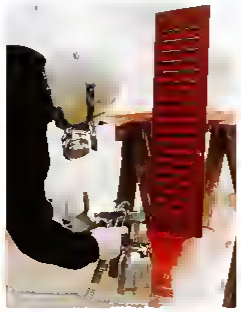
With skin, lunge and ceiling protected, Dee spray-paints crown moldings with his HVLP gun. For fine work, he restricts paint flow. "You can just about turn the gun into an airbrush," he says, referring to an artist's tool that paints with pinpoint control.

a turbine that can push as much as 100 cfm at less than 10 psi. Finely machined HVLP spray guns focus the turbine-generated air into the paint stream, creating a fine mist of slow-moving droplets. Up to 90 percent of the paint from an HVLP sprayer lands on target, compared with 35 percent or less for conventional, compressor-powered systems. Paint that doesn't land where it's supposed to is more than a nuisance. Overspray affects air quality—Southern California has rules favoring HVLP sprayers—and wallets. Some of Dee's paint costs $110 a gallon.

For work outdoors, HVLP is at a disadvantage. It's slow, and the slightest breeze wafts the spray away. On the other hand, "When I have to paint tricky stuff like steam radiators and louvered shutters," Dee says, "it's great."

Setting up the sprayer is no big deal. Dee hooks up and unkinks the hose, then pours paint or primer into the paint cup through a mesh strainer to catch clumps and impurities. Latex paint can be sprayed without thinning, but Dee usually adds a thinner that maintains the paint's body. He thins alkyds (oil-based paints) with naphtha because it evaporates quicker than thinners made with mineral spirits. Despite dramatic reductions in overspray, Dee always works with a respirator or air-supplied hood to keep paint out of his nose and lungs. A swab of petroleum jelly on any exposed facial skin, especially eyelids, makes cleanup easier. And he still masks off areas adjacent to his work—to reduce the chances of a "direct hit," he says.

Dee always has his gun hand in motion, even before he starts spraying, and his hand continues moving after he releases the trigger. Stopping even momentarily increases the chance of runs or sags. He makes long, parallel passes as he sprays, keeping the gun the same distance from the work at all times.



FAR LEFT: **Painting kitchen cabinets is about the biggest job Dee tackles with an HVLP system. After removing and sanding the doors, he lays each one flat and sprays first lengthwise, then widthwise as he moves all the way around the work. This "box coating" ensures that no surface or edge escapes the spray. Cabinet doors usually get four coats, but these got more. The client decided midway through that blue would look better than red. To help exhaust overspray, Dee places fans in the windows.**

LEFT: **Painting shutters or louvered doors is a project that cries out for HVLP. Dee first sprays the end grain of the louvers and the back of the control rod, then hits the inside edges of the stiles as he moves the louvers up and down. "You couldn't do this job easily with a brush," he says.**

(Continued on page 40)

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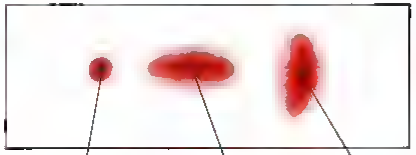
The Painter's Choice: **Spray** or **Roll-On**

All power-painting systems—whether compressor, HVLP or airless—use spray guns to atomize paint, so a lot of paint ends up where it's unwanted. On flat surfaces, a power-roller attachment eliminates mist and reduces painting time significantly.

Spray Patterns

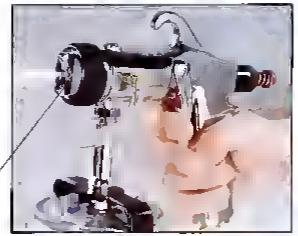


Round patterns work well in tight spots but increase the risk of sags or drips.

Horizontal ovals are best when moving the gun up and down.

Vertical ovals give the most coverage when moving the gun side to side.

A gun's spray pattern can be adjusted by turning the air cap. If the shape isn't symmetrical, the gun's paint nozzle or air passages probably need cleaning.



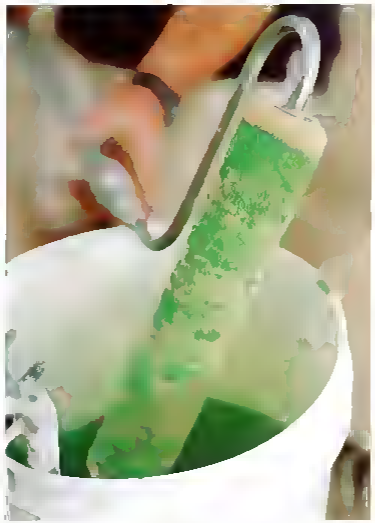
Air cap

© SPENCER JONES

Power-Rolling the Airless Way

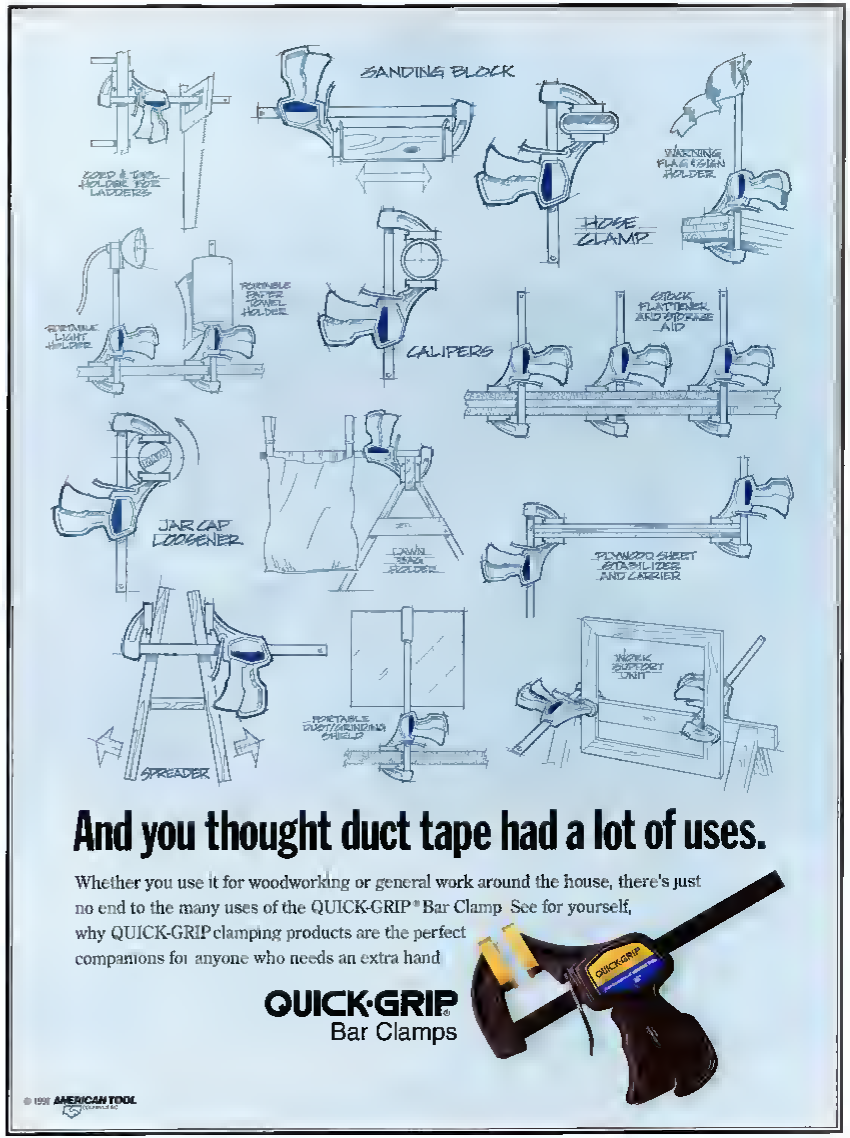
An airless sprayer operates at such high pressure (up to 2,300 psi), paint is atomized as soon as it exits the gun's nozzle. Contractors love the power and speed of an airless, but Dee only uses his to paint siding, and he always brushes immediately afterward "to work the paint in." It's strictly a "production tool" in his view, unsuitable for fine finishing. About 99 percent of the paint from an airless sprayer actually lands on target. Fitted with a power roller, its efficiency is closer to 90 percent. Paint travels through the handle to the roller's axle, where it oozes continuously through a special perforated roller cover. A trigger on the handle controls paint flow. Dee power-rolled the ceilings of this house in about 8 hours; he figures it would have taken 10 with a standard roller.

Look, Ma, no pans. But for all its advantages, there's a downside to power-rolling: "The paint just keeps coming," Dee says, "so there's no reminder to take a break." He operates the paint-flow trigger with his left hand.



Dee runs water or solvent through the system to purge the roller handle of paint. He scrapes off the excess that oozes from the roller cover, then washes the cover separately.

(See Directory, page 112, for details and sources)



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They've Got You Covered

Or do they? Mysteries of homeowners' policies

BY WILLIAM MARSANO

When it comes to homeowner's insurance, policyholders often exhibit extreme attitudes. "It's a safe bet," says Todd Muller, "that it's because they haven't read their policies." Muller, assistant vice president of the Independent Insurance Agents of America, says some people "think homeowner's insurance is a combination maintenance contract and repair warranty. If something breaks, leaks or just stops, they think it's covered. Others take a very narrow view of their policies—so narrow that they don't collect when they should."

Studies by Muller's organization show that those who do wade through the quagmire of legalese rarely understand how the policies are interpreted in real life. Consider the following scenarios:

- A friend drinks too much at your cocktail party, has an accident later and sues you for letting him drive drunk. Although it will probably be the end of a beautiful relationship, you are protected by your policy's liability coverage.
- Playing ball in the backyard, your daughter hits a home run through your neighbor's new picture window. There's coverage if she's younger than 13, even if she did it intentionally.
- While traveling abroad you're mugged, and your car is looted. You're covered for the loss of personal property (excluding your return airline ticket), but only if you come home with a copy of the police report.
- You lose your wallet in the middle of Manhattan. Federal law limits your liability on each credit card to $50, but it doesn't cover ATM cards. Your policy does, up to $500.
- Burglars take the laptop computer from your den. You're covered for up to $2,500 of home-office equipment. But if the burglars had lifted the same items from your hotel room, you'd probably have only $250 coverage.

All these protections are standard in not only the top-dollar

ILLUSTRATION BY NICK DEWAR

all-risk policy, known to the trade as HO-3 after the boilerplate form many insurers use, but also are matched by the cheaper HO-2 policy and even the bare-bones HO-1.

Despite advertising prattle about custom coverage, most policies are off the rack, far more similar than different. The benefit of near-identical policies is that they tend to force insurers to compete on price, service and optional riders covering antiques, jewelry and the like. HO-3 covers all risks except those excluded in the policy—usually flood, earthquake, nuclear accident and war. HO-2 and HO-1 policies cover only those risks that are specifically included. HO-2 lists 17 perils, HO-1 covers 11. About three-quarters of policies written are HO-3.

Even the best policy is only worth what the company that issued it will pay for damages, and the agent who wrote the policy has a lot to do with that. When you have a claim, see the agent first. Avoid calling the insurance company directly. Most homeowners don't know exactly what they're entitled to, and the insurance clerks at the other end of 800 numbers may not be helpful. In the case of ice dams, for example, many homeowners assume that water-damaged walls, ceilings, carpets and floors aren't covered, so they simply ask to have roof repairs paid for. Or worse yet, they don't know how to classify the damage.

"They think any water in the house is a flood, so they say, 'We've had a flood' or 'We're flooded out,' " says Rick Blank, an independent broker in Westchester County, New York. "Private insurers don't write flood coverage, so the claim could be denied out of hand because they didn't say what actually happened. A pipe burst or a sewer backed up or the roof leaked. Never say flood!"

Never say die, either, says Bob Carter, a policyholder's lawyer with Anderson Kill Olick & Oshinsky in Washington, D.C. "There's entirely too much consumer acceptance when claims are denied. Many are handled by clerks making $22,000 a year. They're under pressure to dispose of claims quickly." Carter suggests a step-by-step approach. Notify the insurance agent immediately. Review your policy. Document damage with a camera or videocam. If the initial claim is denied, have the agent request a visit by a claims adjuster. Get the adjuster's opinion on whether the claim should be paid, and request a copy of his report. If the claim is denied again, demand a written explanation.

Despite advertising prattle about custom coverage, most policies are off-the-rack, far more similar than different.

"These steps tell the insurer you're no patsy, and they provide evidence if it's necessary to see a lawyer," Carter says. "Remember that litigation is a last resort, but hiring a lawyer is not. A lawyer's demand letter can produce a settlement without going to court."

And don't be afraid of making a claim for fear of higher premiums. Unlike those for auto insurance, homeowner rates can't be raised individually. All 50 state insurance boards permit only across the board hikes. Nor can insurers cancel policies (drop a policy before its expiration date) except in cases of fraud. However, they can "nonrenew" a policy if they deem a customer a serial claimant. In such cases, insurers don't consult with anyone and don't have to make a case to the insurance board. Their only obligation is to give policyholders 30 to 60 days' notice, depending on the state.

Alternatively, insurers may offer renewal with a higher deductible, engineering out what the industry calls nuisance claims. The result is that the customer gets less coverage but doesn't get a rate increase.

A good agent can prevent this by offering advice about when it's appropriate to make claims, although there are no rules, and different things irritate different insurers. For example, after several years of violent coastal storms in the Northeast, some insurers began nonrenewing policies on properties close to the shore. Depending on the insurer, "close" could mean within a mile or up to three miles. Other customers were nonrenewed because they had submitted too many claims. "Three claims in three years," one agent says. "That raises the red flag." But a couple of claims a couple of years apart may not wake the sleeping giant. "Insurers are really much more tolerant than people think," says Judy Fawcett, an independent agent in Mountain View, California. "Sometimes more than they should be."

But before you test out this theory, remember Rick Blank's view. "Three or four $400 claims, close together, on a policy with a $250 deductible? That's a candidate for nonrenewal," he says. "Insurance companies hate those claims because the cost of handling the paperwork is probably higher than the settlement. So if the screen door blows off, fix it. Don't claim it."

The best solution may be to ask for a higher deductible before the company forces it on you. Moving from a $250 to $500 deductible can cut your annual premium by 10 percent. And you'll stop worrying about red flags.

(See Directory, page 112, for details and sources)

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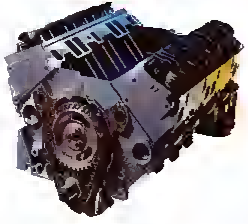

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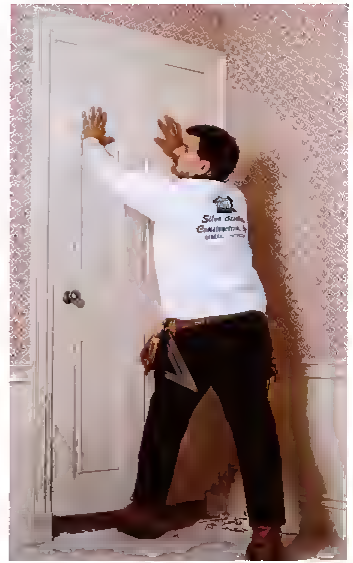
Real Carpenters Hang Doors

Forget about those namby-pamby prehungs

BY THOMAS BAKER PHOTOGRAPHS BY KELLER & KELLER

Open, shut, open, shut—a door is such a simple device, so easily taken for granted. Until, of course, it won't close, or it sticks or sags. Then the finesse required to hang it properly becomes clear. Doors are so tricky to install and adjust that many contractors won't fuss with them at all, insisting instead on prehung versions, manufactured as assembled units with jambs and hardware. Not Tom Silva, *This Old House*'s contractor. He loves hanging a door properly. And he considers this particular skill one of the hallmarks of a real carpenter.



Before he mounts a door, Silva first checks it in the doorway. After some trimming, this door fit fine at the top and sides but came up short at the foot.

Silva had a ready-made opportunity to show how it's done during last winter's renovation project in Salem, Massachusetts. Slicing through a second-floor wall, the crew reopened a doorway buried beneath century-old plaster and paper and discovered the original jamb still intact. All Silva needed was some trim, a threshold and, of course, a door. He scavenged one from a closet that was eliminated when a room was remodeled. Although it matched the other doors on the landing, it was too wide and too short. But that didn't stop Silva. "You just have to take your time and remember a few basic principles," he says.

Biscuit joints guarantee a strong bond and create a good alignment for the filler piece Silva edge-glues to the door's bottom.

It also helps to know the nomenclature. A door has a head and a foot and a hinge side and a latch side. The door frame is lined by jambs (head jamb, latch jamb, etc.) and surrounded by the casing, or trim, and it closes against narrow molding strips on the jambs called stops. A door's push side rests against the stop; the obverse is the pull side.

As Silva began the job, he first used his level to check that the vertical jambs and stops were plumb. Stops can be pried up and adjusted if necessary, but out-of-plumb jambs have to be reshimmed. Here the jambs were fine. The salvaged door had to be trimmed to fit the opening. The proper width of a door is ⅛ inch less than the doorway itself, leaving a reveal, or gap, of

⅛ inch (the width of a nickel) on the latch side and ⅛ inch (a dime) on the hinge side. Using a trim saw with a 4½-inch blade, Silva cut the door down on both sides to preserve its visual balance. He also beveled the latch-side edge three degrees toward the stop. This way, as the door is closed, the push-side edge will clear the jamb and the pull side will maintain a tight reveal.

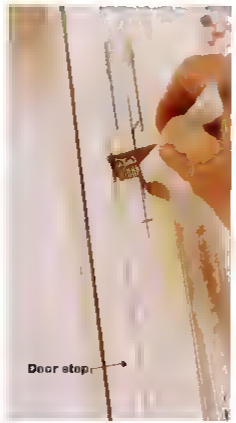
Once the door fit from side to side, it had to be adjusted at the head and foot. Silva simply lifted it into the opening, holding it against the stops and right to the head jamb. What he found was typical: The jamb wasn't level, leaving a gap above the latch side. He measured the gap at its widest point and marked off the same distance on the hinge side. Then he drew a line from the mark to the opposite corner and cut along it. (The same technique matches the door's foot to the threshold.)

To fit the opening, the door needed to be lengthened by several inches. Silva squared up the bottom with his router, then cut a filler piece from a pine plank the same thickness as the door and fastened it to the bottom using biscuits and wood glue. Two screws, deeply countersunk so they wouldn't interfere with future trims, served as permanent clamps. After the glue dried, he belt-sanded the joint and made two vertical cuts with a utility knife to simulate a continuation of the

Installing the hinges

SCRIBING AND CHISELING A MORTISE

LEFT: Holding the hinge knuckle against the face of the door, Silva scribes around the hinge leaf with a utility knife to define the boundary of the mortise. He mounts the top hinge 7 inches from the top of the door and the lower hinge 9 inches from the bottom. RIGHT: Silva chisels out the mortise first with closely spaced downward cuts, then with a series of sideways paring cuts that leave a flat-sided, flat-bottomed recess. If he has more than one door to hang, he saves time by making a jig and blasting out one mortise after another with his router.



TRANSFERING MEASUREMENTS TO THE JAMB

LEFT: To determine where to cut the jamb mortise, Silva first measures the distance from the side of the door facing the stop to the hinge leaf. RIGHT: Using the stop as his starting point, he transfers the measure to the jamb, adding ⅛ inch to be sure the door won't hit the stop when it closes. The top hinge sits 7½ inches from the head jamb to allow a ⅛-inch reveal above the door; the bottom hinge is 9 inches above the threshold for a ⅛-inch reveal below. Once Silva is certain his marks are aligned, he begins chiseling.

joint between stile and rail. The repair was indistinguishable from the original.

Silva likes to mount the hinges on the door first, chiseling shallow mortises so the hinge leaves are "just a hair proud" (slightly above the surface). Burying hinges causes the door to strike the jamb before it's fully closed. For the hinges on the jamb, he marked and chiseled two more mortises, then drilled pilot holes a tad toward the stop so the screw would draw the hinge tightly into the back of the mortise.

The actual hanging took just a few seconds. With the hinges assembled and mounted on the door, Silva hoisted it into the doorway and drove a 1½-inch screw through each free hinge leaf into the jamb and door frame. With just one screw in each leaf, it's easier to make any adjustments later on.

Now the moment of truth. He grabbed the knob and pushed the door shut. It stuck

Work boots come in handy on this job. Balancing the door on his foot, Silva drives the first screw into the top hinge; another screw in the bottom hinge will suffice while he makes any fine adjustments. Drilling pilot holes into the mortises is an essential step.

on the latch side, so he gave the edge a quick shave with his block plane. Then he checked the reveals at the top and latch side. ⅛ inch. Perfect. On the hinge side, ⅛ inch. Perfect again. And after the new threshold was installed, there would be a ⅛-inch gap at the bottom.

However, the door wanted to swing open, indicating the hinges weren't plumb. Silva likens it to a book held by one cover. Tilt it one way, it opens; tilt it back, it closes. He backed out the lowest screw (it's always easier to fiddle with the bottom hinge) and nudged the hinge leaf slightly away from the stop. Then he drove the remaining screws, mounted the striker plate for the latch and installed a beveled threshold cut from an old heart pine plank.

Three hours after he started, he had the door swinging evenly in its opening, just as if it had always been there.

Silva's Secrets for Tuning Up an Old Door

TOP OF DOOR STICKS
Drive a long screw through a sagging head jamb and into the door frame above it. Don't overdo it, though. It's easy to open a gap between the head and side casing or to split the jamb. Tom doesn't mind planing a bit off a door's head either, but too many trims will make a door look out of proportion.

HINGES OUT OF ALIGNMENT OR UNEVEN VERTICAL REVEALS
Fit thin cardboard shims cut from cereal boxes into the jamb mortise beneath the hinges. Be careful, though. Too much shimming will cause the door to stick.

DOOR STICKS IN THE LATCH-SIDE JAMB
The problem may lie on the opposite side. If the hinge leaves are loose or the hinge-side jamb is listing, reanchor loose leaves with longer hinge screws. Correct jamb tilt by driving a long screw behind the top hinge and into the door frame. If all else fails, shave a bit off the door stile with a block plane.

DOOR RESISTS BEING CLOSED
The door is hinge-bound. Try shimming the hinges, remounting the hinge leaves on the jamb farther from the stop or removing any hinge-side accretions of paint from the jamb stop and door edge.

MOISTURE TROUBLE
A door that functions well in the winter may swell into a nuisance with summer's humidity. Painting the top and bottom edges helps reduce seasonal swelling. Otherwise, trim the door with a block plane where needed.

(See Directory, page 112, for details and sources)

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A Letter From This Old House

I have dreamed for years about building a weekend house, and each summer in Boston, when the heat and humidity descend on the city like a curtain, I eagerly embrace these longings, if only in my mind.

The temptation among those who do act on this desire is often to replicate in a vacation cottage what they have at home. But I think underdoing it, not overdoing it, is the key. Simplicity and comfort are intertwined. In site, size, style, equipment and finishes, less is usually more.

Where would I start? With the setting. A vacation house should connect with its terrain. My romantic image is of a cool mountain meadow with stunning views. But sometimes the most dramatic sites are a bit too exposed. A feeling of security aids relaxation. Perhaps the best way to know exactly where to put a cabin is to camp on the land during several seasons, including winter and summer.

Although the house will need to be bigger than a tent, my guiding star is smallness—a footprint of 30 by 35 feet should be plenty of space. Clean lines give a sense of harmony, and harmony provides comfort, so I gravitate toward straightforward farmhouse styles. My construction preferences include a standing-seam metal roof—it lasts for decades and the snow slides right off—as well as low-maintenance cedar board and batten siding left unpainted. For a year round vacation house in severe climates, energy efficient windows might be worth the expense. I'd use adze finished beams, bead-board walls and wide pine floors. The kitchen, dining and living areas would be contained in one great room, preferable to more formal arrangements. The comfort of a fire is essential, so I'd anchor the room with a big Rumford fireplace faced in fieldstone.

I have no need for sophisticated mechanicals. A plumbing system that allows drainage of all pipes from a central valve is convenient and eliminates the need for heat to prevent pipes from freezing when no one is home. But electricity is less essential than most people imagine. Some friends built a weekend retreat in New England without modern conveniences. Gas lamps give bright light, a hand pump draws water from the well, and a fireplace and wood stove provide plenty of heat in winter. Even when it's 10 degrees below zero outside, they're comfortable. The all-wood interior is soothing to the eye, the crackle of the fire provides background music, and the sting of cold water on the skin each morning refreshes the spirit.

This seems less and less like the summer to build my own vacation cabin, so I will content myself with the project of fixing up a house on Nantucket Island. But my dream will not go away, and soon only the real thing will satisfy.

Steve Thomas

gshp

BY WENDY TALARICO PHOTOGRAPHS BY GARY MOSS

Ground Source Heat Pumps operate on a radical principle: Why buy fuel to cool or heat your house when most of the energy you need is buried in your backyard?

Alex and Monica Jenkins are among the first homeowners in California to put in a ground source system to heat and cool their house. The technology is innovative, but it's also complicated. Here, Alex Jenkins and *This Old House* plumbing and heating expert Richard Trethewey go over the details during installation.

during summer heat spells, Sacramento, California, feels like an oven turned inside out and stuck at 110 degrees. The air smells of reheated asphalt and cooked vegetation, and the streets are empty and quiet, except for the grumble of overworked air conditioners.

Alec and Monica Jenkins's 76-year-old stucco house bakes like a 3,700-square-foot pizza. Two rattly window air conditioners mitigate the heat, but the house is far from cool, even though the homeowners pay approximately $150 a month to keep the window units running.

This spring, with another hot summer looming, the Jenkinses decided it was time to install central air conditioning as well as a new furnace—the original natural gas-fueled boiler ate more than $1,000 worth of fuel a year.

Just as they were on the verge of selecting a system, the couple learned that the Sacramento Municipal Utility District was looking for customers willing to try a little-known heating and cooling system called a ground source heat pump. In return, the utility would pay more than $4,000 in installation costs.

Recently deemed "the most energy-efficient and environmentally sensitive of all space conditioning systems" by the Environmental Protection Agency, ground source heat pumps capitalize on the constant temperature of the earth to heat and cool a building. Below the frost line, the ground remains at a relatively steady 55 degrees. "Instead of using fuel to create heat, they move heat that already exists naturally in the ground," says *This Old House* plumbing and heating expert Richard Trethewey.

There are only 150,000 of the devices installed in homes in the United States, but the Geothermal Heat Pump Consortium, which includes the EPA, the Department of Energy, 240 electric utilities and 20 heat pump manufacturers, is out to change that. With $100 million at its disposal (one-third from taxpayers and the balance from the utilities), the consortium is offering rebates, reduced utility bills and other incentives to entice homeowners.

Ground source heat pumps work much the same as air source heat pumps but are astonishingly inexpensive to operate—so much so that the Jenkinses seemed in shock when contractor Greg Schillianskey estimated they could save $1,450 a year on their energy bills.

Drillers use jets of water and dual bits to gouge four 5-inch-wide, 200-foot-deep holes for the loop of pipe. The holes must be at least 10 feet apart for optimum heat transfer. Multiple holes are cheaper to drill than a single deep one.

The Price Tag

Ground source heat pumps have a payback period of three to five years. That's the amount of time it takes to save the additional cost of the system in fuel bills.

The Jenkinses received estimates of $8,500 for a natural-gas furnace and central air conditioning (including ductwork). The ground source heat pump they bought cost $13,750.

Here's how the numbers broke down: Heat pump (3.5-ton unit) and flow center: $4,900 Ductwork: $3,600 Drilling for three holes: $3,600 (four were installed, but one will be used by the local utility for experimental purposes. Three loops would normally be sufficient for a 3,700-square-foot house.) Pipe: $1,650

The couple's fuel bills (including natural gas to run the furnace and electricity to power the window air conditioners) average about $2,050 a year. Their bills are expected to drop to $600 a year, a savings of $1,450 annually. Providing the system works as it's supposed to, that gives them a payback period of less than four years.

how the pump works

Illustration by Maris Bishofs

To understand the four basic parts of a ground source heat pump, draw a rectangle on a piece of paper. Put the words "outdoor heat exchanger" on the top line and the words "indoor heat exchanger" on the bottom line. Put the words "expansion valve" on the left side and "compressor" on the right side. You now have a schematic of the system. In the refrigeration, or air-conditioning mode, refrigerant travels in a counterclockwise direction around the box. In the heating mode, it reverses and travels clockwise. Here's how the system works to produce air conditioning. The refrigerant (an inert gas similar to Freon) enters the outdoor heat exchanger (a device like a car radiator), where it passes heat to the water running through loops in the backyard. Cooled by the water, the refrigerant becomes a liquid. It then runs through the expansion valve, which drops the pressure and, therefore, the temperature. The cold refrigerant next passes through coils in the indoor heat exchanger. A fan blows across the coils, forcing cold air into the house and warming the refrigerant into a gas. The gas travels to the compressor, which increases the pressure and, therefore, the temperature. Then the outdoor heat exchanger begins the process all over again.

To produce heat, the system reverses. Cool liquid refrigerant enters the outdoor heat exchanger, where it is warmed by the ground water and becomes a gas. The gas gets hotter after passing through the compressor. Then a fan in the indoor heat exchanger blows over coils filled with the gas, heating the house and cooling the gas into a liquid. The liquid is further cooled after it passes through the expansion valve. The process begins all over again when the refrigerant hits the outdoor heat exchanger.

Each borehole contains two sections of pipe joined at the base with a hairpin coupling. The pipe is fused to the coupling using a 510-degree iron, creating a seal that won't leak.

Trethewey has followed the evolution of the ground source heat pump like a baseball fan following the career of a promising rookie. He joined Schilhanskey in Sacramento to help install the Jenkinses' system. "I was curious to see how conditions differed in California," says Trethewey, whose work is normally confined to the Northeast.

Although ground source systems have been around for 50 years, they have become affordable and accepted only in the last decade. "This is a technology that's so logical, it's ingenious," Trethewey says.

The heart of the system is a loop of high-density polyethylene pipe sunk into the earth through which water or, in cold climates, nontoxic antifreeze circulates. The fluid absorbs warmth from the ground in winter and brings it into the house. In summer, heat from the house is transferred back into the comparatively cool ground. The cooling and heating needs determine how much pipe is used; larger systems require more pipe because there's more heat to move around.

The loop is installed horizontally in 3- to 6-foot-deep trenches or vertically in 50- to 250-foot-deep holes drilled like water wells. Sometimes the loop is laid at the bottom of a pond or lake to take advantage of the steady water temperature. Loops can also be shared; in some communities, 50 or 60 houses draw from a centrally located loop.

Water from the loop, warmed or cooled by the earth, moves into the heat pump's flow center. There, a pump and manifold sort out the supply and return lines, direct the water into the compressor unit and ensure that the pressure within the loop remains constant.

Sacramento's soil is hardpan, a mix of clay, gravel and loam that works well for ground source heat pumps because it is dense and transfers heat to and from the loop easily. Air spaces in dry, sandy soil act as insulation, inhibiting heat movement, so installations in Nevada, Arizona and other

Above: Monica and Alec Jenkins discuss the cost of the system with Trethewey and utility reps. The local utility kicked in more than $4,000, including $750 for relandscaping the side yard.

Right: The polyethylene pipe Trethewey is holding carries a 50-year warranty. In the early days, ground-source systems used metal piping that was fragile and likely to leak.

The manifold, left, where supply and return tubing meet, merges copper piping and polyethylene tubing with brass fittings. The flow pump, right, moves the water through the system at a rate of 12 gallons per minute.

Tubing that connects the flow center to the attic compressor unit was run through what used to serve as the laundry chute. The unit fits snugly beneath the roof rafters.

desert areas require careful backfilling. Solid rock is the best medium for transmitting heat, Trethewey says. "It's more expensive to drill, but the holes will be shallower. You don't need as much pipe."

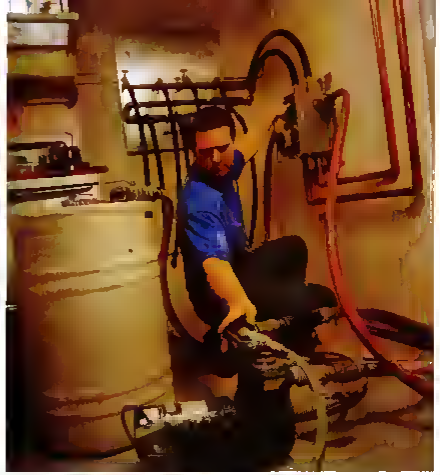
For this job, Schillianskey sank ¾-inch polyethylene pipe into four 200-foot-deep boreholes. Multiple holes are cheaper to drill than a single deep one and allow the flow center's pump to work more efficiently. He backfilled the holes with bentonite, a clay that expands when mixed with water, filling any air spaces between the pipe and the ground.

The piping was bundled together in a trench leading to the basement, then threaded through holes drilled in the foundation wall and connected to the flow center.

Schillianskey installed the flow center in the basement and placed the clothes washer-size compressor unit in the attic. Keeping the flow center in the basement minimizes water problems if a leak develops.

The ductwork is no different from that in a conventional forced-air system. What is different is the temperature of the air flowing from the registers in winter. With an air source heat pump, the flow is seldom warmer than 80 degrees. But because water transfers a greater volume of heat than air, a ground source heat pump is able to deliver warmer air, typically about 110 degrees.

Many ground source heat pumps include a desuperheater, a component that skims residual warmth from the compressor to heat water. In summer, when the system is working to get rid of heat, the desuperheater provides practically free hot water. Because most systems are oversize (heating systems are designed to heat a house on the coldest day of the year), there's usually enough warmth left over for low cost hot water in the winter too.



The final step in installing a ground source heat pump is to fill the loop with water—in this case, from the homeowners' garden hose. The system holds about 70 gallons. A purge pump is used to remove air from the loop so that water pressure remains constant.

Unlike air source heat pumps, ground source heat pumps are placed inside the house, protected from the elements. The system is quiet—the Jenkinses report that after several months of use, they've never noticed a hum or a rattle. And there is no combustion, which makes it safer.

The only problem is one of economics. Ground source heat pumps cost at least 30 percent more than conventional heating and cooling equipment. "I can't think of any circumstances where homeowners won't save money by installing a ground source heat pump," declares Jim Bose, executive director for the International Ground Source Heat Pump Association. Even if the homeowners move to a different house before the payback period is up, he says, the lower utility bills make the house more salable.

John Proctor, an energy consultant and engineer in San Rafael, California, concurs. "When it's properly sized and installed, a ground source heat pump will lower energy costs, especially compared with air source heat pumps."

But what if the homeowners just can't afford the upfront costs? That's a problem if the local utility doesn't have any sort of rebate program. "But," Bose says, "people should think of this as an investment, just like a mutual fund."

heat springs eternal

A chorus of frogs croaks all winter long in Mohawk Valley, California, even when heavy snowfall fills the main road and seals off this remote section of the Sierra Nevada Mountains. Patches of grass sit obstinately green, although the entire valley is frosted over. And standing on the veranda of the White Sulphur Springs Ranch one can hear the burble of running water even when the bitter cold drives others inside. Geothermal springs, oozing from the valley floor, stay at about 95 degrees all year long, warming the frogs as well as the 144-year-old ranch house, once a stagecoach stop and now a bed and breakfast. A seemingly endless supply of hot water is pumped into polyethylene pipes that wind beneath a portion of the first floor of the house, providing hydronic heat without any boiler. The water, which cools somewhat after making its way through the pipes, is expelled into a meadow across the road. The rest of the house is heated by a ground source heat pump with an open loop system. Hot water is pulled from a spring, pumped through the system, then discharged. (Cooling power isn't necessary in this part of the country.) Because the water entering is so warm—about 95 degrees—this ground source heat pump is about twice as efficient as most installations. The only problem, according to the ranch's owners, is that the level and temperature of the spring water changes temporarily after earthquakes.

TRYGVE RITO YAMADA/FPG INTERNATIONAL CORP

Hot springs provide free heat if your house is nearby.

See Directory, on page 112, for details and routing.

an american craftsman

Michael Seward

A FURNITURE MAKER WHO CHERISHES NATURE'S MISTAKES

by Walt Harrington

When Michael Seward finished his first piece of furniture, a small Shaker-style glove table with delicately tapered legs, he set it in the center of his basement. A bare overhead bulb caught the roping grain of the curly maple, creating the impression of a mountainous terrain mapped in shades of dark and light. Burls seemed to float in three dimensions, and as Seward circled the table, the wood grain appeared to

PHOTOGRAPHS BY THIBAULT JEANSON

move, to roll and heave like ocean waves.

Seward studied the table for hours that day. His obsession with its beauty confounded him. He had the unnerving feeling that the table had been created from a place within him that he did not yet recognize or understand.

"I was mesmerized," he says.

He had first seen the curly maple boards at a lumberyard and couldn't pass them up—they were just so beautiful!—although he had no idea what he might do with them. And yet, a few months earlier, when he and his wife, Karen Holway, had been skiing in Vermont, he had wandered into a bookstore and bought a collection of shop drawings by furniture maker Thomas Moser. He had thought to himself: "I understand this. I see how furniture is put together. Let me get a table saw and get to work."

That was seven years ago. Today, Seward makes his living creating furniture, and he cannot imagine doing anything else. His work can be found in homes in and around Baltimore and Washington, D.C., and is displayed at the Main St. Gallery in Annapolis, Maryland.

A Michael Seward library cabinet—60 inches high, 20¾ inches wide, 16 inches deep—will soon stand in my living room in a small, idiosyncratic nook next to the fireplace. It will be made from unusually wide, deeply whorled cherry boards taken from a single tree in Lancaster County, Pennsylvania. The tree, which stood next to a creek that still spawns native trout, was perhaps 75 years old in its last days. Seward can tell its story by examining the wood. Tiny insect boreholes record the tree's decline; rings are wide or narrow depending on a year's rain or drought; a deer hunter's rifle slug missed its mark and lodged in the trunk, a dark spot of bark was entombed like a body at Pompeii after a branch broke off and the wound was engulfed by fresh growth.

The cabinet Seward will build from the boards is simple: a traditional design in natural cherry to match a natural cherry couch and chair. The cost: $1,865. "It's simple in design," he says. "Not so simple in execution."

It is more than a decade since Seward, now 41, decided to abandon his job as a social worker, buy a house in Baltimore, renovate it and sell it for a profit. He'd never done handy work, so he began watching Norm Abram on *This Old House*, then went to the library for books on how to drywall, miter trim, build decks and install kitchen cabinets. It took him several years to finish the house.

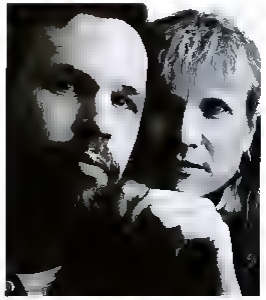
At that point he decided to try making the Shaker style glove table. As he studied it in his basement, he had—how else to say it?—that epiphanic flash. With his humble eight-inch Black & Decker table saw and Elu router, he went on to build a chest of drawers, two cocktail tables and a jewelry chest. "I wanted to create," he says. "I've always felt that feeling."

He sold the pieces of furniture, then someone saw the kitchen cabinets he'd made for his house and hired him to build a kitchen. With the security of a commission in hand, his wife, who was working at a high-paying banker's job, jumped at the chance to take a buyout offer. They moved to the countryside near New Park, Pennsylvania, and job by job, they began buying tools. A planer and a jointer, chisels and knives, $75,000 in equipment so far. Last year they sold $60,000 worth of furniture and custom kitchen cabinets and made $30,000 for themselves.

"It hasn't been easy," Holway says.

Their 1,600-square-foot shop smells of linseed oil, sawdust, machinery and, most of all, wood: cherry, birch, walnut, sugar maple and bird's-eye maple, a wood that fascinates Seward. Standing with one foot on a pile of neatly stacked rough-cut lumber, he leans down to rub mineral spirits onto a board of bird's-eye maple to reveal its swirling grain. "This is a freak of nature," he says. "Nobody knows what causes it. You have to find it by sheer chance."

A sideboard built from the same cherry log Seward is using for the library cabinet sits nearby, almost finished. The faces of the three cabinet drawers form a long, undulating landscape. "It gives a canvas for showing off the wood," he says. As he talks, he splays long, dexterous fingers and gestures with his hands in gentle, expressive arcs at his chest. The hands are worn, protected by



Seward and Holway rarely talk while working in the shop.

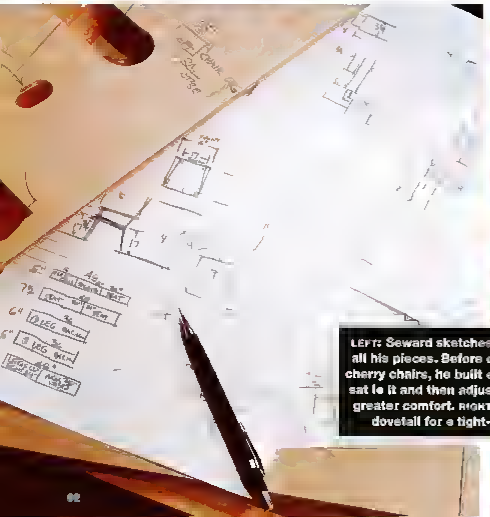
four calluses on the palms from grasping and turning clamps and tools. "Even if people don't consciously notice that the grain matches, they will notice it subconsciously. Woodworking is an ancient art, so there's nothing new in putting the furniture together. The wood is what makes it special."

Seward and Holway, who is 39, work together. At first she handled only business matters, but over the years she came to spend more and more time in the shop, measuring and cutting and sanding. Recently she too began signing each piece of furniture. As he is captivated by the visual beauty of the wood, she is enthralled by its sensual qualities, loves knowing the scent of, say, red oak versus white oak. She rubs the wood when it's rough with splinters and then rubs it again after it has been planed, when she can still feel the tiny blade cuts and nicks, and then rubs it again after she has sanded and oiled and buffed and shellacked it, then oiled and buffed it at least six more times, until it is nearly frictionless to the touch.

"There's a joy in doing it by hand," she says.

"To put yourself into the work," he says.

The pieces for the library cabinet have been cut to



LEFT: Seward sketches elaborate drawings of all his pieces. Before constructing this set of cherry chairs, he built a mock-up out of maple, sat in it and then adjusted the proportions for greater comfort. RIGHT: Holway chisels out a dovetail for a tight-fitting drawer joint.

LEFT: Few people would ever check the joinery in the back corner of this chest drawer. If they did, they'd see that Seward has used a miter joint held together with a walnut spline. RIGHT: Seward and Holway discreetly sign each piece of their furniture.

length and width and jointed and planed to parallel thicknesses. The cherry is dense heartwood, 16 inches wide, rare today. Also rare is the winding, salmon-colored grain that reflects light differentially, creating an illusion of depth. On the cabinet's back piece, Seward has showcased the dark spot where the tree's bark was enveloped by growth decades ago. Many would see this as a defect. He sees it as nature's fingerprint.

Seward can spend hours deciding how the grain should run throughout a piece. Here, the inside stiles of a cherry library cabinet door are book-matched and accented with black viola tuning pegs and mullions dyed black for a richer color.

This is a simple cabinet. When all the wood is finally ripped and crosscut and the dado, rabbet, mortise, tenon and dovetail joints are cut and glued, when the brass hinges are mortised and installed and the horizontal rails and vertical stiles of the doors are cut from a single board and the inside stiles are book-matched and the door glass is installed with tiny brass pins, when the shelves are cut from one board with grain that flows like a waterfall from shelf to shelf, when the entire cabinet is sanded, oiled and buffed and the door pulls are in place and it's delivered and standing in a nook next to the fireplace, Seward and Holway will have worked 100 hours and spent $645 on materials.

Their real wages: $12.20 an hour.

He says: "We're trying to do pieces valuable enough to justify spending the time doing them for the pure joy of it. I'd love to be able to afford my own furniture. But that's part of the poverty of woodworking. You build these beautiful pieces, and they're gone, in somebody else's possession. The work is not inherently satisfying in and of itself. It's very tedious—a lot of noise and sawdust and aggravation. But there's something beyond that. There's something about the end of the day, when you're done.

"You've added value to the world."

That's what kept him going when he heard a man at the Main St. Gallery gripe that the prices were outrageous. It's what calmed him when he cut a tenon too short or built a cabinet too boxy. It's what made him work 11-hour days, seven days a week.

Seward has always been a patient man. That is an unyielding demand of craft. But he is now more patient than ever. And he has become a better builder. He can cut a dovetail joint with little concentration now, and that has mattered not because it has made his work easier but because it has freed his mind to ponder and design, moved him closer to the source of why he felt so compelled to build furniture in the first place.

His tools are better now, and that too has mattered. So many men believe that if they only had the tools, the horsepower, they could build an elegant sideboard or library cabinet of wonder. But the tools aren't the source either. Seward built his first pieces with a table saw that wobbled so badly its ¾-inch blade made a ¼-inch cut. No, the source of Michael Seward's ability was his belief—his blind certainty—that the pure joy of adding value to the world would someday be worth the agony of apprenticeship. How did he know that?

"I have no idea," he says.

Seward has some clients who earn large incomes at jobs they dislike. Those unhappy people often seem to romanticize his life, imagine he works whenever he pleases. He laughs at that. He hasn't had a day off in years. "I think that one of the reasons they buy the furniture is to associate themselves with the lifestyle it represents to them."

Still, most of Seward's clients aren't wealthy. They return to the gallery repeatedly to see a piece, touch it, contemplate it. As Seward was mesmerized by his first table, they too are mesmerized. They save their money, fearing that someone else might buy the piece they want. Some of them say the furniture seems to speak to them, and Seward believes he speaks to the new owners through the furniture, touches them in some unspoken way.

He got a letter recently from a woman who bought one of his pieces. She wrote: "The table was purchased to honor the love I feel for my husband. It brings us both great joy." Seward was touched. "That she was so taken by this quiet, unassuming piece of furniture in this almost religious way is remarkable. It's not just an object. It's of deep emotional importance to her."

A few years ago, he read *A Cabinetmaker's Notebook* by James Krenov, among the world's eminent woodworkers. Krenov wrote, "Sometimes, when I work, this creeps into the atmosphere: the sense that maybe the wood and the tools are doing, and want to do, something which is beyond me, a part of me, but more than I am." Seward calls that sensation "the poetry of woodworking." It is not such a presumptuous leap. As the poet Rita Dove once wrote, "One writes in order to feel: that is the fundamental mover." For the craftsman, that is the source.

When Seward and Holway deliver the library cabinet, they have added black door pulls that are actually tuning pegs for a viola. He likes that they echo the room's black piano, she likes the way they feel between her thumb and forefinger. Oiled and buffed, the cabinet is aflame, rich and warm in transparent reddish shades and tight, lavish grains. The cabinet, Seward says, isn't only a possession that belongs to my wife and me but an extension of who we are. Other people with the same nook, he says, would have chosen a different style of wood, objected to the bark fingerprint or the viola pegs. Then he stands back, ever confounded.

"I'm very proud of it," he says. "It's beautiful."

The "cat's paw" chest, nicknamed after footprint-like markings in the cherry, was an experiment in illusion. Rather than rest the case atop four straight legs, Seward attached curving legs to the sides of the chest to "make it look as if the chest is ready to walk away."

See Directory, on page 112, for details and sources

Homeowners Jim and Kirsten Gaiet, left, with kitchen designer Terry Searborough and *This Old House* host Steve Thomas. Their mission: selecting a pair of sinks for the kitchen addition to the Gaiets' 75-year-old Connecticut home.

in search of the

ultimate sink

BY WENDY TALARICO PHOTOGRAPHS BY JOSHUA McHUGH

Not many years ago, redoing a kitchen meant tough decisions about everything except the kitchen sink. The sink was simple: white-enameled cast iron or silvery stainless steel; one bowl or two. Now, picking a sink requires more research than selecting a computer.

There are farm sinks, pantry sinks, vegetable sinks and half sinks. Sinks for corners, islands, bars and counters. They are mostly round or square, but some are shaped like amoebas. They are gold-plated, solid brass, slate, stone, fireclay and plastic. They are

$29 and rinny or $2,300 and solid copper. Some would look just fine flanked by Renoirs.

Jim and Kirsten Galef's search for the ideal sink is typical—nothing less than an odyssey. And they need two. They thought it would be simple. It isn't. Yet all they want are friendly, old-fashioned sinks that will hold up well for a family of six in the new kitchen addition to their 75-year-old house in Greenwich, Connecticut.

Diligent consumers, they arrive early one morning at a swank kitchen and bath store in nearby Stamford. They seem a bit bleary eyed from a night of

The Galefs quickly rule out sinks made of composite, stone and brass. Steve is a fan of stainless steel.

browsing the Internet ("Did you know you can buy a sink online?" Jim says). They are guided in their search by designer Terry Scarborough and *This Old House* host Steve Thomas, whose interest in kitchens ranges from designing them to cooking in them. "Especially anything Thai," he says.

First stop: a display featuring a cast-iron farm

one basin **or two?**

1. Composite, one and a half bowls ($460). Resembles enameled cast iron but weighs less. Color-through material means chips and scratches shouldn't show. Lighter colors are more likely to show staining and scorching.

2. Hammered brass, single bowl ($566). Flashy, opulent and expensive, brass is durable but best reserved for sinks that are seldom used. It dents and requires polishing to maintain its luster.

3. Stainless steel, double bowl ($765). Stands up under heavy use and is highly resistant to stains and heat. Choosing 20 gauge or heavier (18 gauge helps prevent dents). Look for an insulating coating on the exterior to dampen noise.

4. Americast double bowl ($370). Porcelain enameled over a proprietary metal and composite base. Americast looks like cast iron, but it's lighter and less costly.

5. Fireclay, square and disposal bowl ($290 and $204). The finish is as durable as porcelain enamel, but the sink may crack and chip if something heavy is dropped in it.

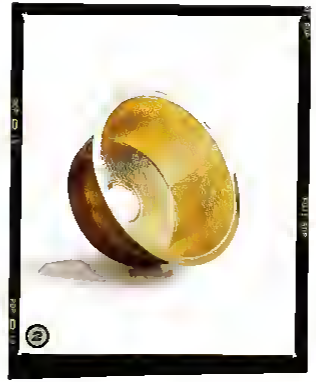
6. Fireclay, single bowl ($1,356). Looks like cast iron but is significantly lighter and normally less expensive. Unlike cast iron, it can be intricately detailed, as in the design on the apron of this pantry sink.

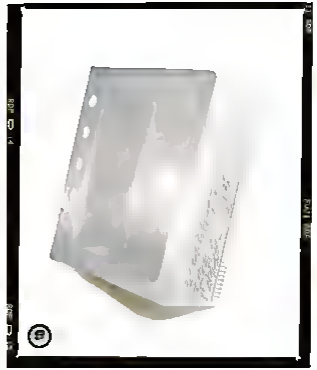
7. Solid surface, double bowl with drain board ($430). Stains, gouges and scratches are easily repaired by scrubbing with a nylon pad. But it's not as resistant to heat as other materials and may scorch.

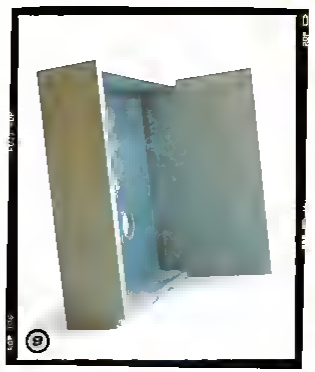
8. Solid surface, double bowl ($525). "Seamless" joint is possible between solid-surface countertop and sink, leaving no place for dirt to lodge.

9. Soapstone, single bowl with backsplash ($800 to $1,200). Made from stone slabs ¾ to 1¼ inches thick. Holds heat well and is easy to maintain—can be cleaned with just about anything. Heavy (this one weighs 300 pounds) and generally custom made.

10. Vikrell double bowl ($300). Fiberglass makes this composite more resistant to heat and stains than other composites. Available in matte or gloss finish.







When it comes to sinks, Steve says, bigger is usually better. Like the Galefs, he prefers a kitchen with two sinks—one for preparation and one for cleanup.

sink. The front, or apron, of the sink is exposed so it looks like a washtub set above the cabinetry. The basin is big. Steve, wielding his tape measure, calls out the dimensions like numbers in a bingo game. "Length 33, width 22, depth 8."

Kirsten's nose wrinkles slightly. "It's nice, but it says 'country.' My kitchen is more formal—English manor-ish—with mahogany cabinets and granite countertops. The interior decorator wants us to put in a copper sink."

"Is the decorator going to clean it for you?" Steve asks. Copper looks great until the first time someone runs water in it. Then it requires polishing and a gentle hand to be sure it doesn't ding. Not right for the Galefs, who have three children and a fourth on the way.

Next up is a composite sink, made of quartz or granite particles suspended in plastic. Jim knocks on the side of the basin, producing a hollow thud. "It reminds me of those plastic bathtubs." Strike composite from the list. Also, based on the Galefs' past research, rule out solid surfacing such as Corian (not "right" for granite countertops), stone (too expensive) and brass (too hard to clean).

At this point, Terry's carefully drawn kitchen plans are unfurled across the showroom countertop and debate over the configuration of the sinks begins. There's a prep sink on the island and a second sink, used for cleanup, beneath east-facing windows and next to the dishwasher.

"Nice layout," Steve says, leaning over the plans. The cleanup sink has two bowls, one big and deep for pots and pans and a second shallower one for delicate items. Bar sinks (averaging 15 by 15 inches) are typically used as prep sinks, but Steve believes they are too small. The Galefs resolve to pick a larger-than-average prep sink and the biggest double-bowl sink they can find. They can't decide which sink is more deserving of the garbage disposal, so they opt to install one in each.

Most sinks come with three to five predrilled holes in the deck, or back, for the faucet, sprayer and various types of dispensers. The Galefs will include a soap dispenser (beats a big plastic bottle next to the sink) and a hot water dispenser at the prep sink.

The first round of decisions made, the group heads off to a kitchen sink supermarket in nearby Norwalk. Hundreds of examples in every size, shape and color hang in rows from the walls. It's here that Steve launches his bid for stainless: It complements commercial appliances, holds up well, is affordable and easy to clean. Some models have a coating on the underside that deadens the rattle of dishes. The coating also insulates the sink to keep dishwater hot.

"But doesn't stainless scratch?" Kirsten asks.

A brushed finish helps disguise scratches, Terry says, and a sink with a high nickel/chromium content is resis-

all the options

The sinks people select are dictated in part by the accessories available. "It's like choosing a car because you like the seats or the steering wheel," says kitchen designer Terry Scarborough. Wood or polyethylene cutting boards, colanders, drainboards, plastic sink liners, dishpans, plate racks—all may be provided by the manufacturer, usually at an additional cost, to fit the shape of the basin.

1. Dish racks and cutting boards fit sink contours for neat appearance and convenience.

2. Plastic colander is handy for straining pasta and rinsing fresh vegetables.

3. Wire basket nests securely, won't slip around in use. Protects sink surface from scratches.

save the **finish**

One look through a microscope at the preesome assortment of microbes and bacteria that thrives in the kitchen sink is enough to inspire anyone to keep it well-scrubbed. But what's the best way to clean without ruining the finish? As a rule, surfaces should be wiped daily with a nonabrasive cleanser and a sponge or a soft cloth. Anything scratchier mars the finish and leaves the material beneath susceptible to stains. Solid surfacing and stainless steel with a brushed finish benefit from a light buffing with a nylon mesh pad to remove scratches and, in the case of solid surfacing, stains or scorch marks. Mirror-finish stainless steel can be kept shiny with silver or copper polish. Avoid discoloration in the first place by promptly rinsing away coffee grounds, tea, tomato juice and anything else that stains. There are as many ways to remove stains as there are recipes for salsa. One suggestion: Soak the area with a poultice of vinegar, mild laundry detergent and water.

tant to rust, pitting and stains. But no matter what material you choose, it will scratch, stain, chip or dent. "There's no such thing as an indestructible kitchen sink," she concludes.

"I guess I'm picturing a big, white cast-iron sink," Kirsten sighs. "It's what my mother always had. It's what I grew up with."

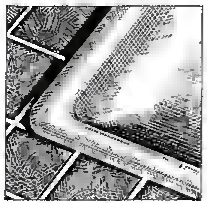
Along the walls are a dozen or so cast-iron sinks. Steve pulls out his tape measure once again to determine which is biggest. "Cast iron is great," he says. "I like its sturdiness and durability. Treated right—no abrasive cleaners—the finish will hold up."

A self-rimming model that measures 38 by 22 inches with one 10-inch-deep bowl and a smaller 7-inch deep bowl has plenty of room for all the dishes generated by a family of six. In white, it's just right.

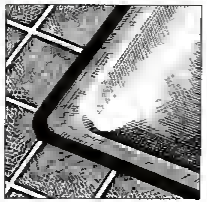
That settled, the Galefs turn their attention to the prep sink. Nearby is a 16-by-20-inch fireclay sink. Similar to vitreous china (the stuff toilets are made of), fireclay resembles cast iron but has a softer sheen. It's also lightweight and fragile—a problem when using it as a cleanup sink but acceptable in a prep sink. This becomes sink number two.

Terry, Steve, Jim and Kirsten give a collective sigh of relief. After five hours of legwork and additional time spent doing research, asking the advice of friends and experts and, of course, checking out the Internet, the Galefs have their sinks. "Well," says Steve, "now you move on to appliances, flooring, lighting, wall coverings...anything else?"

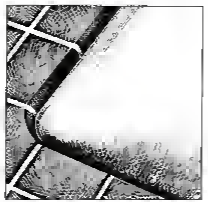
types of **mountings**



1. Self-rimming sinks are easy to install. Just plunk them into a hole routed out of the countertop. Caulking between the sink and the counter forms a watertight seal.



2. On a flush-mount sink, the lip between the sink and the counter is not as pronounced. Like self-rimming sinks, these are easy to install.



3. Undermount sinks mean crumbs and spills can be wiped directly from the counter into the sink—there's no lip in the way. Installation is tricky; the hole in the countertop must be carefully cut. Be sure the countertop material is well sealed to prevent it from soaking up water. Undermounts work best with solid surfacing.

ILLUSTRATIONS BY YUNGHWA CHANG

Steve thinks good kitchen design starts with the sink. "Place the sink first, and lay out the rest of the work triangle from there." He likes the plan for the Galefs' kitchen, which calls for putting the main sink under the windows.

See Directory on page 192 for listings and sources.

woodforgood

The next time a vinyl siding salesman brags about his 50-year-warranty, tell him how long the cedar siding on your house will last

BY THOMAS BAKER PHOTOGRAPHS BY DAVID BARRY

Clapboard is the quintessential American weather shield. All across the land, long thin strips of overlapping, tapered wood planks cast crisp horizontal shadow lines on Victorians, Cape Cods, farmhouses and Colonials. The oldest frame building in North America—the circa 1637 Fairbanks house in Dedham, Massachusetts—wears a clapboard skin. Newer houses in developments also have the look of clapboard,

WHAT IS CLAPBOARD?

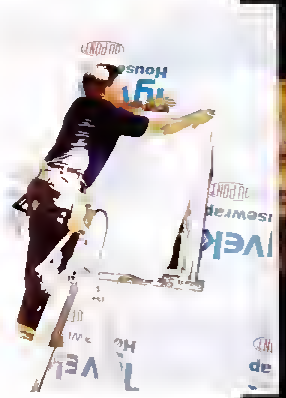
The term derives from the 19th-century Dutch word *clappen*, "to split," a reminder of the laborious way the narrow boards were made. Hand-sawn boards supplanted split siding in early colonial America, and by the end of the Civil War, pine siding was mass-produced. But it wasn't until the late 1800s, with the opening of the ancient stands of Western red cedar in the Pacific Northwest, that homebuilders around the country had the perfect siding material: lightweight, straight-grained, knot-free and rot-resistant. It's the same wood Tom Silva, opposite page, uses regularly on houses in the Northeast.

prepping

When re-siding an old house, Silva first taps his hammer over the sheathing, listening for dull thuds that indicate rotten wood and loose boards. Solid thumps locate studs. After all the punky boards are replaced, he shoots a few extra nails, right, through the sheathing into the studs.

wrapping

Spun olefin housewrap over sheathing stops water and wind; it also lets interior moisture escape, "just like a Gore-tex jacket," Silva says. When cutting wrap around a window, below, he leaves enough extra to tuck in behind the trim.



although the siding often turns out to be a veneer of vinyl or aluminum.

Clapboard goes on fast, presents a solid surface to the weather, doesn't trap moisture and is easily repaired. It's expensive—twice as costly as vinyl—but high-quality clapboard can last for centuries.

Like many features of a well-built house, clapboard appears simple to install. But to do it properly, every joint and edge requires multiple layers of protection to keep out water, and to look right, clapboards must be parallel, consistently spaced and aligned at the corners.

This Old House contractor Tom Silva has been siding with clapboard for three decades. "I love the look of it," he says. "There's nothing nicer than working with good materials."

Before he can begin nailing up siding, Silva must prepare the surface beneath. "If the sheathing moves while I'm nailing, the clapboards will crack." He reattaches loosened sheathing to the studs and replaces any rotten wood. Then he marks the location of each stud on the water table (the horizontal trim board at the bottom of the wall). The marks will show him where to nail through the clapboards.

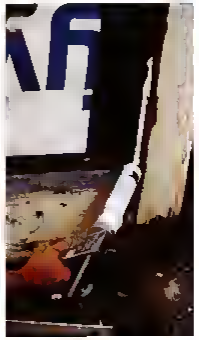
Because wind-driven rain can work its way between and behind lapped siding, Silva always staples wide sheets of housewrap over the sheathing. Then he slips six-inch-wide strips of 15-pound roofing felt behind all the vertical trim pieces at corners, windows and doors and caulks between the felt and trim with an acrylic latex sealant.

All horizontal trim is covered with four-inch-wide strips of lead flashing to keep out water draining down the side of the house. The flashing is nailed to the sheathing with galvanized roofing nails. Silva overlaps all flashing joints two inches or more and seals them with caulk.

To begin the siding work, Silva nails a one-inch wide wood strip across the bottom of the wall. Cut from the narrow edge of a clapboard, the strip cants the first piece of siding to the same angle as the

weatherproofing

If water gets behind clapboard, rot will run riot through sills and sheathing. With three barriers in place—housewrap, felt and flashing—Silva pumps a fourth, a bead of caulk, below, along the corner-board. A 1-inch strip nailed to the flashing, right, gives the first clapboard the same cant as the boards that follow. Silva makes his own strips by ripping down the thin edge of a clapboard with a table saw.



marking

Rather than fiddle with a tape measure, Silva uses a homemade story pole, right, to figure overlap. The marks he transfers from the pole to the housewrap show him exactly where to place the top of each board.

scarfing

If one board isn't long enough to span a wall, Silva joins two with a scarf joint. He cocks his miter saw 45 degrees and trims matching sloped cuts in the end of each board, right, then slides the boards together. Sealed with a fat bead of caulk, below, the scarf joint keeps out water better than butted boards.

fitting

To shape the end of a piece of clapboard to a windowsill corner, Silva first holds the board against the side of the sill to mark its height. Then he places the board on top of the sill, as below, to mark how far it extends beyond the edge of the window. Finally, he cuts out the notch defined by the intersecting lines.

boards that follow. With a few taps of his hammer, he sinks 5d stainless nails about ½ inch above the thick bottom edge of the first siding board and into the studs.

Tempting as it is to continue, Silva stops now to plan a layout. He wants all the boards parallel and dead level, with a consistent overlap. And he wants the bottom edge of the boards at the top and bottom of the window to line up with the window trim. While some carpenters measure the space and laboriously figure and refigure the number of boards that fit, Silva's way is simpler. He makes a story pole. Measuring from one end—the "bottom" of the pole—he marks up every 4½ inches, the most a 6-inch wide clapboard should be exposed.

To use the story pole, Silva snaps a horizontal chalkline one clapboard's width up from the bottom of the windowsill. Next, he rests the pole's bottom on the first clapboard and, holding the marked edge against the wall, angles the pole until one of the marks touches the chalkline. Then he transfers every mark below the chalkline from pole to housewrap. Both sides of the window are story poled so he can snap chalklines between each pair of marks. All he has to do is hold the top of each clapboard to the line and nail away.

Ideally, each piece of clapboard should be long enough to reach from one side of a wall to the other without a seam. When it can't, Silva makes an overlapping scarf joint and beds it in caulk. Just the top board on the scarf gets nailed near the joint. "It's the only time I nail into the sheathing without hitting a stud," he says. He makes sure joints never line up one above the other and that they are spaced randomly.

Once he has fit the clapboard to the windowsill, Silva picks up the story pole again to determine the spacing to the top of the window. Then he snaps more lines and keeps nailing away, following the same sequence until he runs out of wall.

With the clapboards ready for painting, Silva steps back and looks at the job. "That'll last a good long time," he says.

Good materials, fewer headaches

Siding. Silva uses only the best—clear, all heart, vertical-grain boards cut from 150- and 200-year-old Western red cedars. This grade costs about 12 percent more than the next best grade, called A clear, but it looks better, holds paint better and is unlikely to warp or cup. To calculate how many square feet he needs, Silva measures the total wall area (length times height), multiplies by 120 percent and subtracts the square footage of doors and windows.

Painting. Silva prefers factory-primed clapboards. Priming protects all sides of the boards from moisture, including the often forgotten back. Moisture passing from the house to the exterior through unprimed siding tends to lift and bubble paint and cup boards. Silva instructs painters to brush on an additional coat of oil-based primer (to seal nail holes and joints), fill the nail holes with caulk and finish with two topcoats of acrylic latex paint.

Nails. Silva says stainless steel is the only way to go. Galvanized nails leave black streaks in cedar and rust long before the boards need replacing. Blunt-tipped, ring-shank siding nails reduce splitting and provide the best holding power.

Caulk. Use lots of it around joints and trim, Silva says. Go for a siliconized acrylic latex caulk with a long warranty.

Housewrap. Spun olefin is best, in Silva's view, for keeping out wind and rain. The fewer seams the better, so he buys it in nine-foot-wide rolls and wraps it around corners and over windows. At seams, he overlaps the sheets by a couple of feet and seals them with plastic tape. Any wrinkles remaining are smoothed, folded over and stapled flat.

Flashing. Sheet lead is Silva's favorite because it's so easy to work. "I can bend it without a metal brake," he says. Copper and painted aluminum flashing are other long-lived alternatives.

moving up

A clapboard wall swiftly acquires its characteristic look as Silva nails course after course to the sheathing. He uses lead flashing at the head casing on the window. "If you only rely on caulk to keep water out, you're asking for trouble," he warns.

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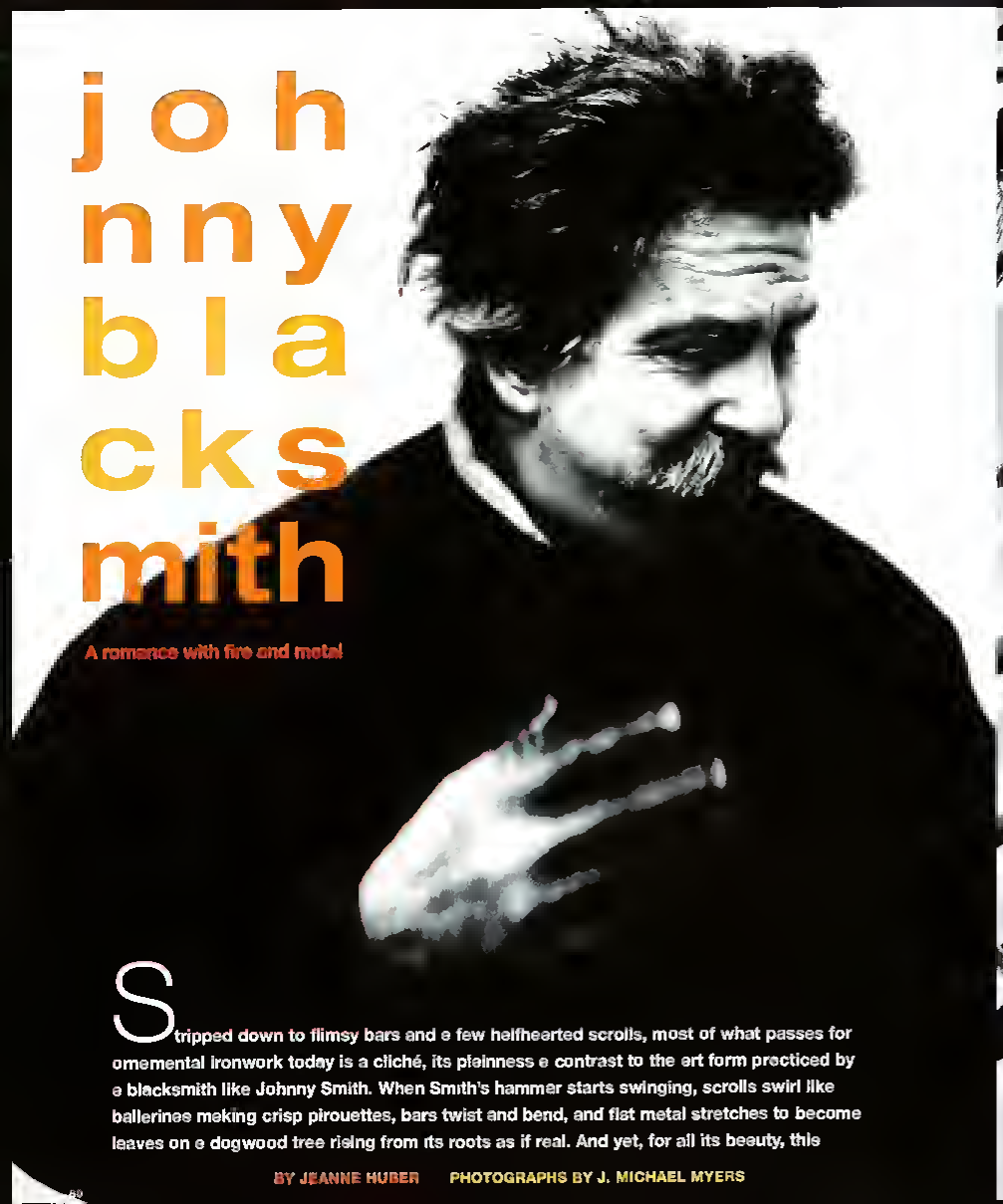
johnny blacksmith

A romance with fire and metal



Stripped down to flimsy bars and a few halfhearted scrolls, most of what passes for ornamental ironwork today is a cliché, its plainness a contrast to the art form practiced by a blacksmith like Johnny Smith. When Smith's hammer starts swinging, scrolls swirl like ballerinas making crisp pirouettes, bars twist and bend, and flat metal stretches to become leaves on a dogwood tree rising from its roots as if real. And yet, for all its beauty, this

BY JEANNE HUBER PHOTOGRAPHS BY J. MICHAEL MYERS

With its roots seemingly anchored in brick steps, a dogwood tree crafted by Johnny Smith lends elegance to a side entrance in Savannah, Georgia. The $5,000 gate has 68 blooming clusters—the kind of lavish excess that distinguishes Smith's work.

gossamer gate stands guard against intruders as effectively as more businesslike plain metal bars

Imaginative ironwork is a disappearing art. The only contact most people have with blacksmiths these days is at living history museums. And even the traditional metal they use is disappearing. Wrought iron is more than just a method. The material itself is iron extremely low in carbon (.04 percent) that becomes soft when heated. Demand for low-carbon iron is so limited that only one smelter still makes it—

We're called blacksmiths because iron was the black metal.'

England's Ironbridge Gorge Museum. At $7.50 for a foot of one-inch square rod, it costs as much as good copper. Most of the world's blacksmiths choose to work in mild steel, a widely available alloy with a low carbon content (.6 percent) and a price of only 65 cents a foot.

Although the material has changed, true wrought work is still hammered into shape. Much of today's so-called ironwork is only heated and bent, or cast from molds. Both methods can produce beautiful results, but neither captures the richness of hammered metal. Bent surfaces are flat instead of undulating; scrolls are chopped off at the ends instead of tapered or tightly rolled. Cast designs can be elaborate yet never subtly different.

Blacksmiths are often lumped together with other ironworkers, but their title is a direct transfer from Old English, in which "smith" designated a person who shaped metal by pounding. The definition later grew to include anyone skilled at making anything. "We're called blacksmiths because iron was the black metal," says Smith.

Some blacksmiths make nails, others make four ton gates. Smith has done both. Some follow traditional designs, some invent their own. Smith did the traditional work on Mills and Marianne Fleming's 1884 townhouse in Savannah, Georgia, last winter's *This Old House* project. But he does such jobs only occasionally. Traditional work consists mostly of repeating patterns that are hammered into shape on a jig. "The sculptural work is when you build the jig. After that, it's crank and grind," he says.

Smith's true calling is a type of blacksmithing he terms "photo realism with stylistics." He delights in creating scenes that look as if they were caught on film. Every leaf has veins, every feather has barbs. He often works from designs drawn by his wife, Rhonda, an art teacher. He also copies what he observes in nature. "When I see something a little different, I just pull a leaf. Then I put it on a sheet of paper and trace it."

But even the most accurately traced leaf, once cut from metal with an oxyacetylene torch, remains cold until given life in the forge. Iron can be molded like clay when heated, and a blacksmith can transform it from hard to soft as often as he wants by moving pieces into or out

Smith hammers a scroll, above, until it's tight against a jig. Wrought iron railings often include scrolls because they keep children from falling through and they're easily formed. The same scroll in place at the Fleming house, below, where it echoes the home's original ironwork.

‘All the alchemy is in the fire.’

Blackamiths learn to read color as a measure of their power to reshape iron or steel. Pieces that are mid-orange to brilliant red, 1,700 to 2,000 degrees Fahrenheit, can be pounded or bent without cracking. At 2,500 degrees, white hot, they can be welded. These mango leaves glow atop coal mountains that, like volcanic peaks, have molten centers. The “magma” is coke, which is to coal as charcoal is to wood. Coke burns hotter than coal, producing smokeless fumes. Visitors to Smith’s shop often want to feel the heat over the fire, but he passes a 2x4 over the coals instead. When the wood bursts into flames, his point is made: “When you don’t see the smoke, that’s when it’s really dangerous.”

As if from a handful of sparklers, burning metal flies as Smith strikes a white-hot rod. At this temperature, iron is fluid enough that hammer blows will weld two pieces into one. If a piece this hot were left on the forge for just a few moments more, it would ignite like a Roman candle. “You’d be literally burning up the metal,” Smith says.

of the fire. That courtship with the coals keeps Smith going during the hellishly hot Savannah summer. “I’m drawn like a moth to flame,” he says. “All the alchemy is in the fire.”

Smith looks every bit the sorcerer as he dances around his forge in baggy black clothes, with bushy gray hair billowing from eyebrows, mustache and ponytail. Using dime-store reading glasses to protect his eyes from flying embers, he mounds, tepee like, a burning pile of coals to heat a 20-inch leaf that will grace a mango-tree lamp for a hotel in San Juan, Puerto Rico. Above the forge, Smith has rigged up a 48 inch exhaust fan to protect his lungs (“This is like smoking 30 packs of cigarettes a day”) and a tarp to screen out sunlight so he can see the color of the hot metal.

His eyes are on the flames. When he sees cherry-red steel, he picks up tongs in his gloved left hand, grabs the leaf and carries it a few steps away to his anvil. With his right hand, bare because a glove might mask the feel, he picks up a hammer, raises it and slams it down. Forty-five times in 20 seconds, he recoils and swings. Then, faster than sunset gives way to twilight, the red fades to black, and he tosses the piece back into the coals.

Watching Smith gives new meaning to the phrase “strike while the iron is hot.” If a blacksmith

Smith began blacksmithing at age 15 using his grandfather's tools, but just as a hobby. Twelve years ago, while working as a mechanical engineer, he got his first commission: ornate entry lamps for a mansion planned by an acquaintance. The house was never built, so the two-ton lamps were installed on this house instead. "All the architects said was, 'Jeez, Johnny, aren't they a little too big for the house?' So I said, 'No, they're a *lot* too big.' "

hammers when the metal is too cold, it will crack. But if he leaves "too many irons in the fire"—heating several pieces at once to be sure of always having something at perfect pounding temperature—some of the metal will burn up.

Smith errs on the side of keeping plenty of irons in the fire. One reason, he says, is that the faster he works, the hotter his anvil gets, allowing him more hammer blows per "heat." He gets more work done because he spends less time carrying pieces between forge and anvil.

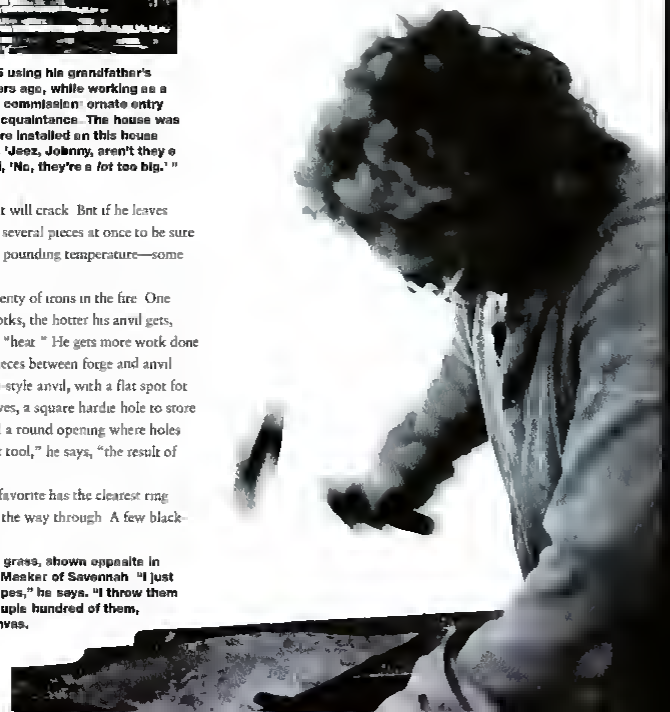
Smith uses what is called a London-style anvil, with a flat spot for most shaping, a horn for working curves, a square hardie hole to store tools used to make specific shapes and a round opening where holes can be punched. It is "almost a perfect tool," he says, "the result of 2,000 years of innovation."

He has several such anvils, but his favorite has the clearest ring when struck because it is hardened all the way through. A few black-

smiths play anvils as musical instruments, but most choose those that ring for a practical reason. "The harder the anvil, the more lively it is, the more it rebounds the hammer," Smith says. To illustrate the point, he allows his hammer to fall and bounce freely until it finally comes to rest. A hammer that bounces back by itself means less work.

Smith says he can swing a six-pound hammer at 40 miles an hour, an estimate he made after reading a book on ergonomics. When he needs more muscle, he switches on his electric-powered hammer, a behemoth that delivers a 100-pound hit at 60 miles an hour. "It's pretty impressive," he says. "It's pretty dangerous too. I know guys who have severed their hands or fingers in machines like this. The amputated part is no thicker than paper."

Smith's hammer never falls the same way from day to day, and each piece of iron he shapes is different from any other, a unique work of sculpture. "What amazes me is that creativity is a bottomless well," he says. "When I started, I feared I'd run out of ideas, but one breeds another."



Smith's most repeated form is marsh grass, shown opposite in a heron gate built for John and Jean Masker of Savannah. "I just bend the pieces in long, graceful shapes," he says. "I throw them in the corner. Then, when I have a couple hundred of them, I build a frame. It's like an artist's canvas. Then I assemble the picture."

Every leaf has veins, every feather has barbs.

See Directory, on page 112, for details and addresses.

serious shutters

BY BRAD LEMLEY
PHOTOGRAPHS BY BERND AUERS

There's no ambiguity in the name we give to those double doors that flank the windows of our houses. Wa call them shutters. So it seems raasonable to expect them to shut. But these days, they seldom do. That's because tha original purpose of shutters was to repel sun, wind and brigands, functions that hava bean suppianted by air conditioning, stronger window construction and security systams. As shutting shuttars bacama passá, contractors began screwing them to the siding, and shutter manufacturers responded by making ever-flimsier shutters.

The gruesome denouement of this trend is the vinyl shutter. Not only ugly, it is often so frail that if mounted on hinges, the warranty may be voided. No wonder homeowners awash in renovating costs are tempted to dispense with shutters altogether.

But an old house stripped of its shutters is an affront. Proper shutters proudly proclaim a home's age, announce its architectural style and reflect the local climate. For example, the wide, sturdy louvers of the Bermuda shutter notify us that we have entered hurricane country. "Shutters are the beauty mark on a house's cheek," says Georgia restoration consultant Reneau de Beauchamp. "It's very important to get it right."

The right shutter is closable, durable and practical. One of the best places to find it is inside a former carpet warehouse in the rolling hills of Canton, Georgia, 35 miles north of Atlanta. There, the 15 employees of Cobblestone Mill Woodworks turned out the 22 pairs of custom shutters needed for last winter's *This Old House* project in Savannah. President Bill Amari founded the company five years ago after a search for quality shutters to put on his mother's Atlanta home. "The lumberyard guys told me it would be an 8- to 10-week wait, and who knows what it will cost? I said, 'I'll build my own.'"

Some $300,000 in woodworking equipment later, Cobblestone turns out 200 pairs a week. In addition to stock sizes sold at retail outlets, the company increasingly makes custom shutters to the precise specifications of architects and renovators. No design is too strange, including those with ultralarge louvers and rounded tops. (Technically only solid doors are shutters, while those with louvers are called louvered blinds, but that term is becoming archaic.) Although he never advertises, and an average pair of his custom shutters costs $150—compared with about $50 for a pair of stock pine shutters at a warehouse store—Amari can barely keep up with demand.

The typical Cobblestone shutter is made of incense cedar (*Libocedrus decurrens*), a member of the cypress family logged in California and the Pacific Northwest. It's the same wood used to make pencils, and the odor permeating the factory conjures up images of a freshly sharpened Dixon Ticonderoga No. 2. Cobblestone makes shutters of redwood, mahogany, cypress and oak, but Amari says incense cedar is less expensive and just as durable.

Handmade from the best woods and properly hung on hinges, they stop sun, storms and even the occasional brigand

ABOVE LEFT: Cobblestone president Bill Amari, center, and employees share lunchtime pizza with Lucky, the shop dog. ABOVE RIGHT: A German-made, $50,000 automatic router simultaneously carves grooves in two stiles for the ends of the fixed louvers. The grooved stiles will have mortises cut into them to receive the rails. BELOW LEFT: When shutters are less than 72 inches long or 18 inches wide, they're assembled with dowels like these, two at each joint. Larger shutters are made with stronger mortise-and-tenon joinery. BELOW RIGHT: Assembler Mike Cresswell inserts louvers with a practiced snap. When all are in place, he'll squeeze the shutter together in a pneumatic press that develops 120 pounds per square inch of pressure.

Amari's devotion to quality borders on fanaticism, and his specifications serve nicely as a checklist for evaluating the quality of any shutter. First, he says, avoid shutters made with finger joints, which are often used to create long, knot free lengths of wood (you can spot them as zigzag seams in the stiles, the shutter's vertical members). "We've found that in some old shutters the bottom has just fallen right off. It breaks at the finger joints." If the shutter is more than 72 inches long or 18 inches wide, he suggests insisting on pegged mortise-and-tenon joinery, in which each joint is held fast with glue and a wooden peg that pierces both rail and stile. While more labor-intensive and thus more expensive than using dowels, such a joint is essential to overcome a shutter's tendency to sag as it hangs on hinges year after year.

Second, note the position of the middle rail. Typically it's placed smack equidistant from top and bottom—symmetrical but completely wrong. The slide bolt that locks the shutter closed goes on this rail. Consequently the rail should be low, about a third of the way up from the bottom, so that the homeowner can reach through the open window and easily lock the shutter.

Finally, for complete authenticity, look for shutters with a rabbet-and-bead cut into the stiles. This is a carved flourish that allows the shutters to mate securely when closed.

The only historical inaccuracy Amari finds forgivable is the use of fixed-louver shutters to replace traditional movable-louver versions. That swap was made at the Savannah house. Because the louver ends are locked securely in grooves in the stiles, fixed-louver shutters are slightly sturdier and about 25 percent cheaper. Movable louvers will, however, allow more of a breeze to pass through. Cobblestone, which makes both kinds, affixes a dummy control rod to fixed-louver shutters to make them resemble the movable variety.

But note: The fixed louvers should display the "up" position when the shutter is swung open. An easy way to envision this is to think of rainwater running down the shutter. When the shutter is open, the louvers should be slanted so that they direct rainwater toward the house. This way, when the shutters are swung closed, the louvers will direct rain—and sun—away from the house. Amari estimates that 90 percent of the shutters he sees are mounted incorrectly.

De Beauchamp offers other points to consider.

•Be sure the shutter is appropriate to the house's style and era. Pre-Revolutionary through Federal homes (from the mid-17th-century to 1820) generally had solid-panel shutters on the first floor and fixed-louvers on upper stories. Homes of the Federal through the mid-Greek Revival period (about 1820 to 1860) had fixed-louvers on all floors. Late Greek and Italianate Revival homes (1860 to 1900) had movable-louvers. The neo-Colonial bungalows of the first quarter of the 20th century featured solid-panel shutters with cutouts in shapes such as hearts or birds. From the Depression onward, De Beauchamp says, "it's been pretty much all movable louver."

Norm Abram installs a shutter on the Savannah project house. The hinges are in the proper position: inside the window casing, not beside it.

•Even if the shutters are never closed, they must be sized so that if closed, they would cover the entire window. Few people would put skinny shutters on a picture window, but 15-inch-wide shutters on a three-foot-wide window lack proportion as well. Arched windows require arched shutters.

•Use appropriate hardware. "People get carried away with massive Colonial hardware, but that should be confined to Colonial and Federal era houses."

•It's rarely appropriate to put solid-panel shutters on upper floors. These were originally for security, so they were regarded as unnecessary above street level.

•Don't use shutters where they don't belong. In mid-Atlantic and Northern states, for example, shutters were often left off the sides or back of 19th-century homes or omitted altogether.

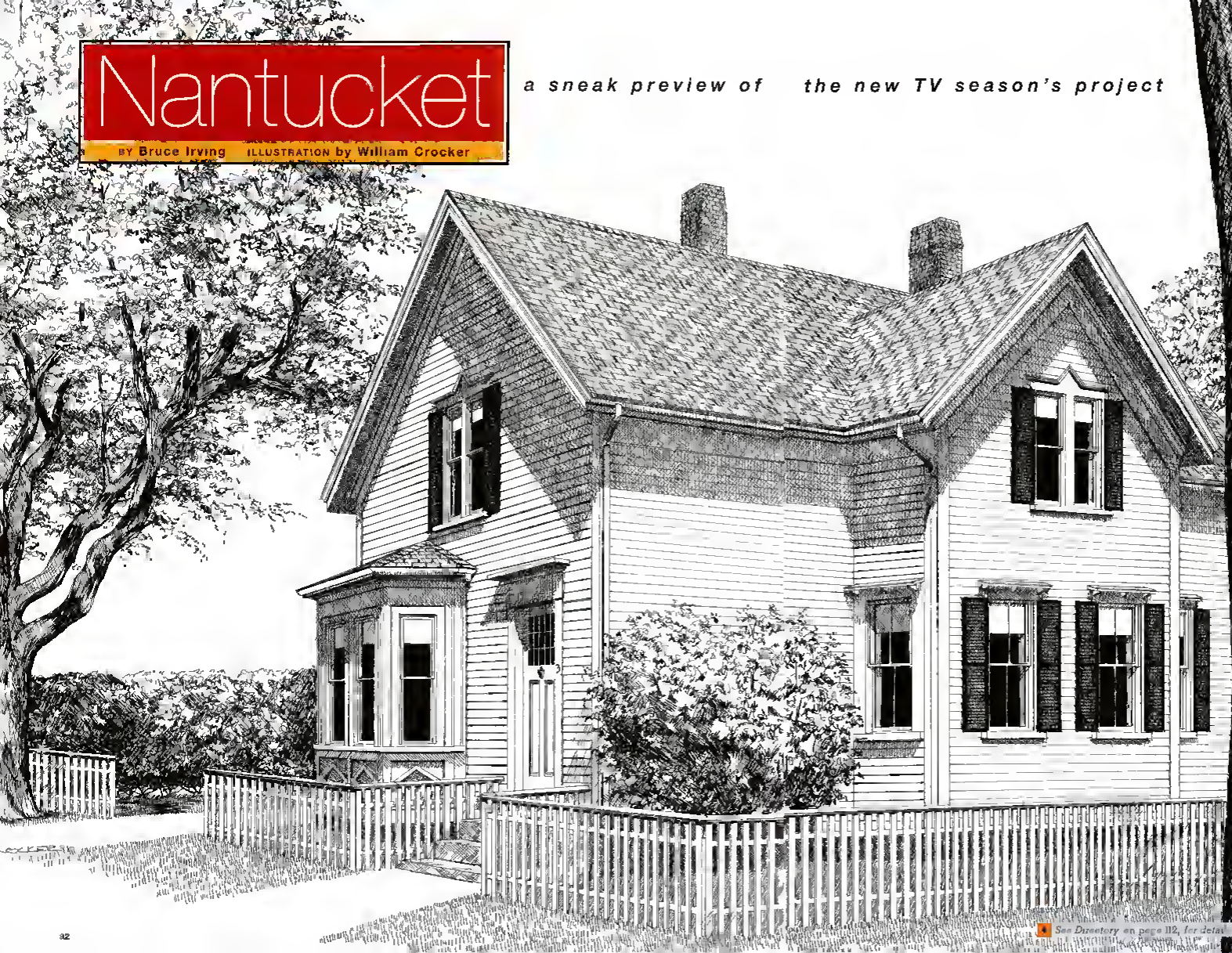
De Beauchamp says that even in 1996, it can be practical to shut shutters. At his home in Decatur, Georgia, he estimates that he saves $110 annually on his electric bill by closing them against the midday sun. Further, he says, reviving the ritual of daily shutter openings and closings can connect one to a slower, more gracious era. "When you raise that window and open those shutters, you stop, look, listen, breathe in the day. When you close them at night, you take a moment to look at the sky. It's a small moment that enhances the quality of life."

See Directory, on page 112, for details and sources

Nantucket

a sneak preview of the new TV season's project

BY Bruce Irving ILLUSTRATION by William Crocker



Two hours out of Hyannis, the water calms, and the ferry of day-trippers slows rounding the lighthouse on Brant Point. Here is a spectacular view of the village of Nantucket and much of this 4½-by-15-mile pile of sand left behind by the last ice cap. Tourists are as thick as mussels on a piling, but that's a relatively recent phenomenon. For most of its inhabited history, Nantucket was home to hardier souls: Algonquins, farmers, whalers and that special breed for whom an island is suitable isolation.

Nantucket still appeals to those who want to escape, as it does to Bostonians Cathy and Craig Bentley and their two children. The Bentleys recently purchased the house at 3 Milk Street, a 15-minute walk west of the ferry dock.

The house is different from its neighbors, most of which are neat as a pin gray Quaker boxes. Number 3 is a homespun Victorian with white paint peeling off in sheets. When it went up in 1887, the builder apparently wanted to be modestly stylish. Half-round moldings form panels with diamonds under bay windows, and small jigsawed brackets support simple window hoods. The attic, sheathed with recycled boards, tells a story of frugality. Before the days of million dollar beach houses, wood was hard to come by here and Yankee thrift ruled.

This Old House will join the Bentleys to make 3 Milk a year-round retreat with new insulation, heating, wiring, a two-story bump out and a second-floor master suite. Watching each step will be Nantucket's Historic District Commission. As the team takes up where the original builder left off, they won't have to scrounge for lumber, but they will be certain to bring their Yankee spirit to the job.

See Directory on page 112, for details and sources

nails

Why we hammer in half a million tons of them a year

Nails are about the oldest fasteners known to man, short of wooden pegs or strips of hide. But even a pedigree dating from 3,000 B.C. doesn't get much respect—nails are still taken for granted, even called the worst fasteners ever devised.

Although the judgment is not entirely unfair, nails have improved over the centuries, acquiring rust-defying coatings and pop-resistant shanks. But refinement isn't their long suit. Screws are sophisticated fasteners, with their pilot holes and countersinks and thread pitches. Nails are about brute force.

Tidy engineers and bureaucrats try to make nails more respectable. Building codes have "nailing schedules" that tell contractors in minute detail which nails (and how many) to drive and where to drive them. The U.S. General Services Administration has written Federal Specification FF-N-105B (promulgated 1971, amended 1977, reviewed 1987). For the lucky winners of federal building contracts, it details lengths, thicknesses, finishes, head styles, point shapes and what materials nails are to be made of.

Nonetheless, nails have stubbornly eluded classification. "We distribute 280 types," says Georgia-Pacific's Alan Schay, "but

PHOTOGRAPH BY JIM COOPER

there must be at least a thousand." Actually, no one knows how many there are because fine distinctions are, well, very fine. Only a few thousandths of an inch separates a brad from a finish nail or a sinker from a corker. And a single nail can have multiple monikers. John McDermott, manager of Mazel, a nail manufacturer in Chicago, always has vinyl-siding, galvanized-roofing, cementboard and asphalt-shingle nails in stock. "They're all the same nail," he says. "I print different labels. I have to. The siding guy doesn't want roofing nails."

Many nails have become extinct. Plastic fruit baskets made berry-box nails obsolete, and cardboard cartons killed the beer case cleat. Seen many hoop nails lately, or sprigs? Apple-box nails? Bill-poster's tacks? Others are in limbo, available only on special order or in 25 pound lots.

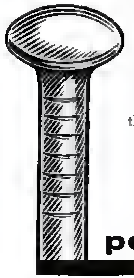
Despite these setbacks, nails remain the people's choice. Americans buy 500,000 tons of them a year, more than any other fastener. Nails pop up in the Bible, in Chaucer, in Shakespeare, in nursery rhymes ("for want of a nail, the shoe was lost"). And they seem to be the preferred fastener of imaginative speech. Debaters who parry an argument spike their opponents' guns (and can then pin their ears back). Figure skaters nail their triple axels or, failing, are nailed by the judges. Long nails driven through planks have their protruding ends clenched (like a fist) or clinched—bent flat against the wood (hence clinching a deal).

Although they may never gain the respect they deserve, nails are always easy to use, cheap and strong. Chosen intelligently and driven well, they are exactly right for the job at hand. They don't have strange little slots in their heads that send one hunting for special tools or bits. The same type of hammer drives just about any of them. One need only pick the right head weight and start swinging. A framer's arm can move at 35 feet per second, and his hammer will hit the nail on the head with 4,200 foot-pounds of energy. It's a satisfying moment, as *This Old House* contractor Tom Silva knows. "Beating the hell out of them gets rid of a lot of frustration."

And that is the honest joy unique to nails. Bang 'em in, drive 'em home, sink 'em—accompanied, in the best of circumstances, by hot sun, much noise and the cheering camaraderie that leads to a fully framed house by sundown as pickup trucks escape in the distance.

Silva on Nails

- **To pick the right length:** "A nail should be two and a half times the thickness of the plank it goes through, but use common sense. If the point sticks out, shorten up."
- **To start a nail:** "Don't grab it high. Hold it near the point, so your fingers are safe and the point is steadied on the wood. Tilt the head away from you a bit so the hammer hits it square."
- **To avoid splitting wood:** Use blunt-tipped nails or "blunt what you have by whacking the points with your hammer. They'll ram through wood like a punch."



poster: tear out along perforation and open

Nails that last a lifetime

Indoors, where rust is rarely a problem, nails made with mild steel do the job. But outside—on porches, roofs and siding—water and air will eventually turn steel into dust. The result might be as benign as unsightly streaks on exterior trim or as catastrophic as the unexpected collapse of a deck. To combat corrosion, consumers have two choices: zinc-coated steel nails or those made with metals that oxidize more slowly. Galvanized nails stave off rust because zinc, a more reactive metal than steel, sacrifices itself to the elements first. But not all galvanizing lasts.

In 1973, the U.S. Forest Products Laboratory in Madison, Wisconsin, pounded nails into pressure-treated boards and subjected them to jungle-moist humidity for 14 years. Hot-dipped was the only type of galvanized nail to survive; electrogalvanized and mechanically galvanized nails nearly disintegrated. The lab recommends that a galvanized nail have at least a 1.7-mils-thick zinc coating. (Useful information, but manufacturers don't print it on the box.)

Not even the thickest galvanizing wards off trouble indefinitely. When a zinc coating isn't enough, good contractors turn to:

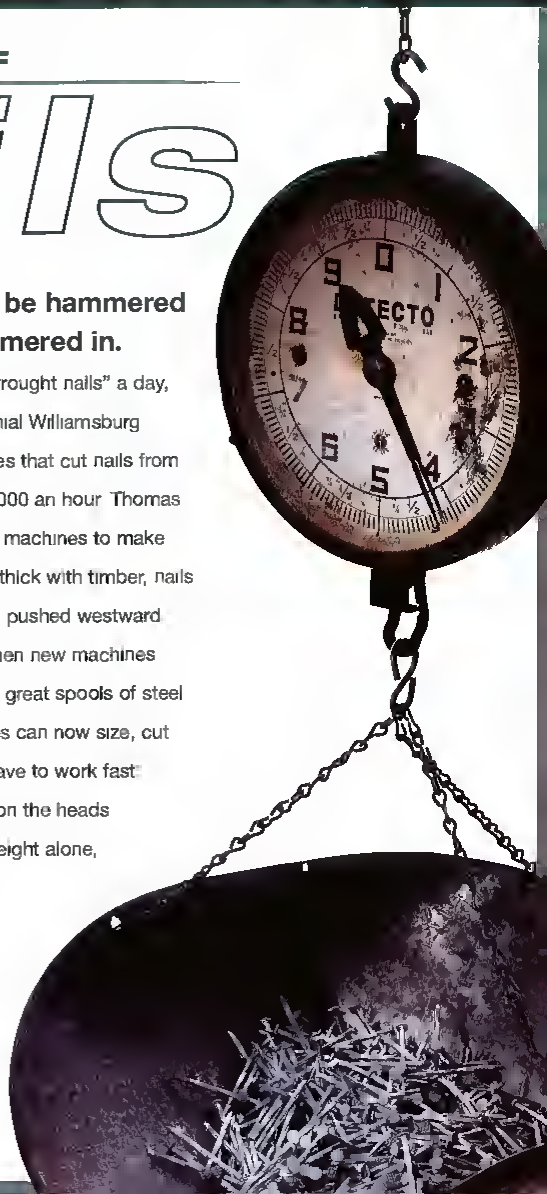
- Stainless steel, an alloy of chrome, nickel and steel. Stainless lost less than 0.1 percent of its weight in the Forest Products Lab test. It comes in types 304 and 316. The latter is more expensive, more durable and recommended for seaside building. Both types react minimally to redwood, cedar and acid rain. They do rust, but only superficially. The biggest drawback is cost: a 25-pound box of 5d stainless siding nails is $150. The same box of galvanized costs $50.
- Silicon bronze, an alloy including copper and tin. These performed almost as well as stainless, with a 0.6 percent weight loss. Look for them in marine supply stores.
- Aluminum. It's an inexpensive alternative to stainless steel for use on siding, fencing and gutters, but it bends with little provocation and oxidizes quickly in salt air. Aluminum nails dissolve in pressure-treated wood.
- Copper. Too soft to use where strength is important, but perfect on long-lived slate or tile roofs.
- Monel, a nickel-copper alloy. This offers perhaps the ultimate in corrosion resistance—and price. A 25 pound box of 8d ring-shanks costs a whopping $400. —*Thomas Baker*

THE NATURE OF

nails

In early America, nails had to be hammered out before they could be hammered in.

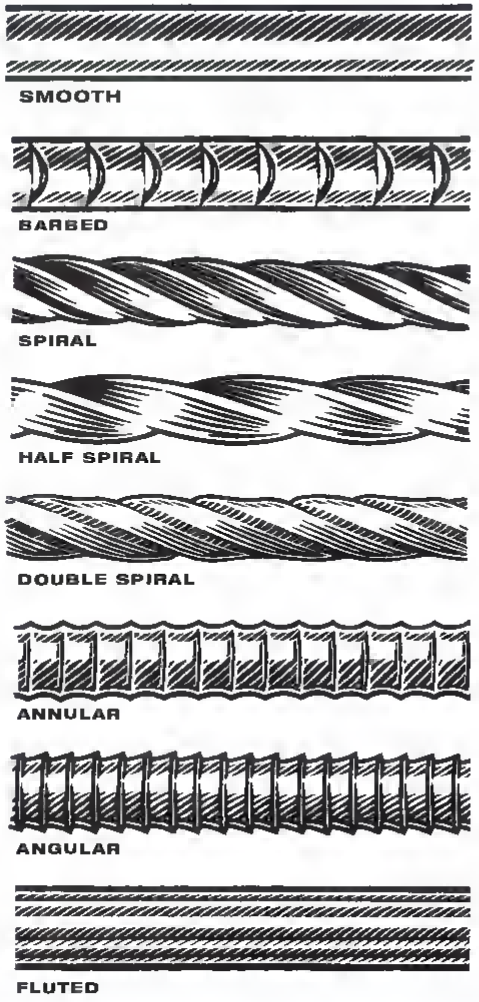
An energetic craftsman could forge 2,000 "wrought nails" a day, says Peter Ross, master blacksmith of Colonial Williamsburg. After the American Revolution came machines that cut nails from thick metal sheets, producing as many as 1,000 an hour. Thomas Jefferson owned one, and convicts used the machines to make nails in prison. Cheap and plentiful in a land thick with timber, nails helped build the frontier towns as Americans pushed westward. Nails became even cheaper in the 1850s, when new machines began making the kinds we use today out of great spools of steel wire, both round and square. These machines can now size, cut and head up to 2,000 nails a minute. They have to work fast. Each year in the United States, we hammer on the heads of more than half a million tons of nails. In weight alone, it's clear the common nail remains the king of fasteners.



This Old House

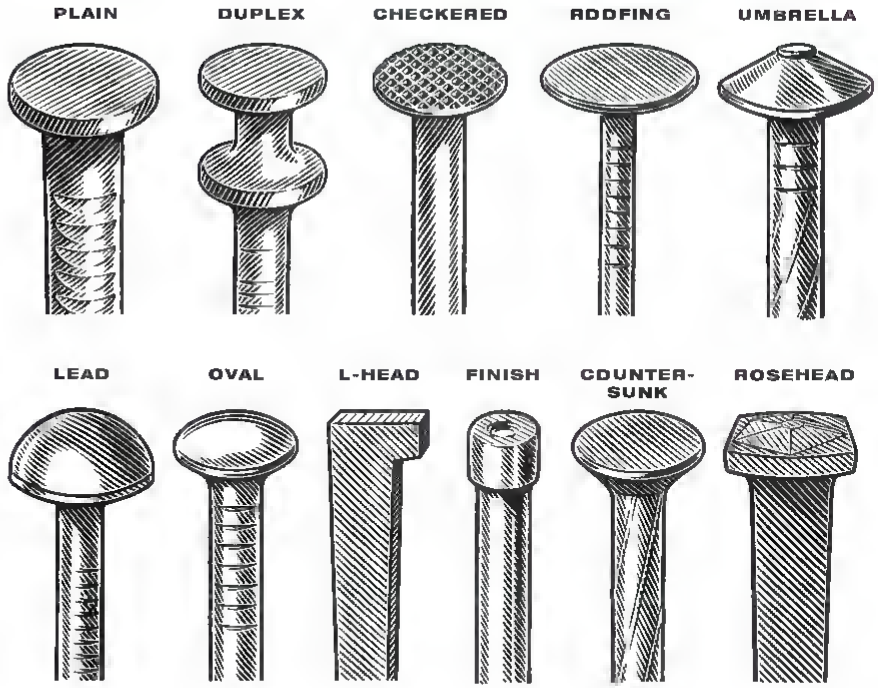
SHANKS

Smooth: Made from plain round wire. The shank of all trades and inexpensive too. (Textured shanks require additional manufacturing steps.)
Barbed: Seldom seen, the result of an early process intended to increase holding power.
Spiral or drive screw: Shank rotates into wood as it is hammered. Takes more effort to drive but provides excellent resistance to popping. Used for decks, siding and flooring.
Half spiral: Easier to drive but still holds well enough to keep planks flat and squeak-free. A favorite of flooring contractors.
Double spiral: A brute to drive—and remove—it provides maximum holding power. Top-quality spiral nails are cut with a die, not twisted.
Annular or ring-shank and **angular:** Individual nibs or rings on the shank engage wood fibers tightly. Often and wrongly called threaded nails, they provide excellent resistance to popping under high loads. But once the load threshold is crossed, popping is sudden. (Smooth shanks surrender more slowly but at lower loads.) Ring-shank nails lose some holding power when hot-dip galvanized because the zinc tends to clog the rings.
Fluted: Straight or slightly spiraled grooves ease penetration of hardened nails into concrete or masonry.



PHOTOGRAPH BY JIM COOPER

HEADS

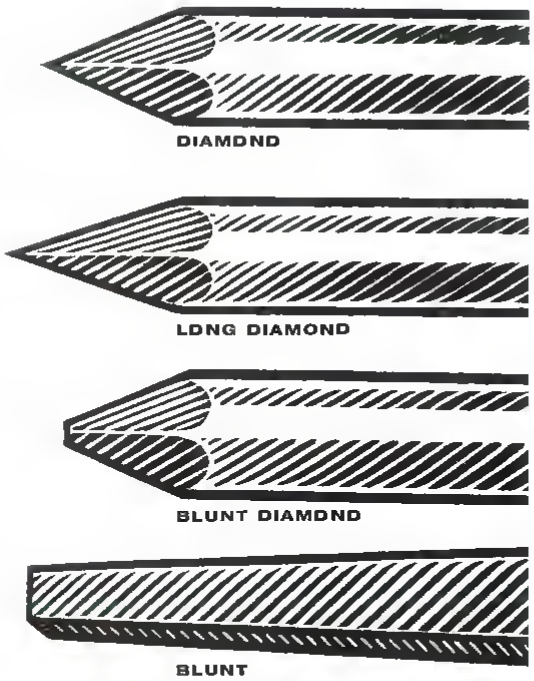


Plain: The common head of the common nail, flat on top and bottom.
Duplex: Two plain heads on one shank. Upper head remains above the surface to facilitate removal from temporary structures such as scaffolds.
Checkered: Holds extra zinc or paint so hammering won't chip off the protective coating.
Roofing: Oversize to reduce "tear through" of roofing felt and asphalt shingles.
Umbrella: Wide rim allows nail to be driven without crushing corrugated metal roofing. Also helps cover the hole.
Lead: For use on flat metal roofing. Soft lead dome, hammered flat, seals the hole.
Oval: Protects wood from hammer scarring. Found on old-style siding nails.
L-head: Used on hardwood finish flooring. Those with two hooks are called T-heads.
Finish: Dimpled or cupped so it can be driven below the surface with a nailset, then puttied over. Heads on larger finish nails may not be dimpled.
Countersunk: Curved underside allows it to be driven flush without dimpling the wood.
Rosehead: On cut nails, raised area helps center hammer blows and provides decorative accent.

ILLUSTRATIONS B

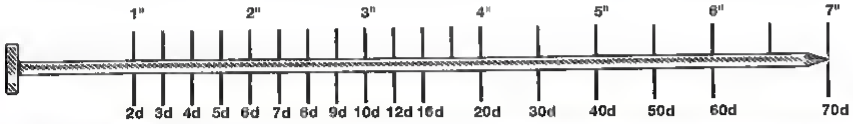
POINTS

Diamond: The most common point style, it eases a nail's entry into wood and wedges fibers apart. The point is formed when nail-making machinery cuts the nail off on four sides, producing the distinctive facets. Cuts from only two sides produce chisel points, found in heavyweight hardware such as railroad spikes.
Long diamond. An extra-sharp point permits easy penetration of drywall. A variant is the needle or needlepoint, which is equally sharp but unfaceted, like the tip of a freshly sharpened pencil.
Blunt diamond: Reduces the risk of splitting wood, particularly when driven through thin stock or near the ends and edges of planks. Blunting regular diamond points by whacking them with a hammer achieves the same result.
Blunt: A squared tip helps prevent splitting by shearing wood fibers rather than wedging them apart. Found mostly on flat-sided cut nails. Blunt-tip round nails are still available from some manufacturers by special order.



pennyweight

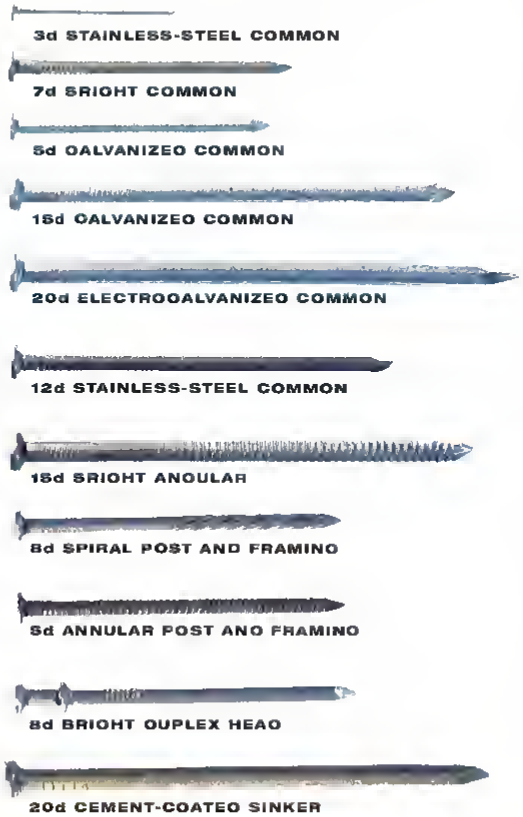
Penny designations originated in 15th-century England. The abbreviation "d"—from Rome's penny, the denarius—meant penny or pence. But the functional meaning is unclear. One explanation, that so many nails could be purchased for a penny, seems wrong; it makes 60d (6-inch) spikes cheaper than 2d (1-inch) brads. D may have indicated the price per 100 nails of a given length, thus relating cost to size. But it could also have been the price per pound. Fuel for speculation: Why are box nails shorter than common nails of the same penny? Why is the increment of length on the penny scale inconsistent? And for your thoughts.



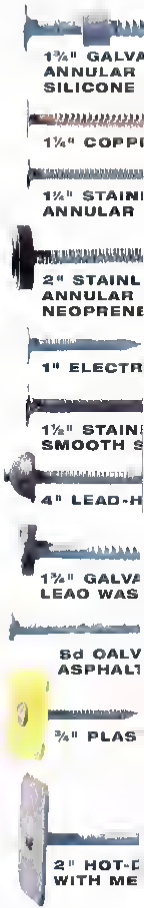
Y CLANCY GIBSON

A FIELD GUIDE

framing



These are the nails that make hammers ring as a house rises from foundation to ridge beam. Most framers rely on common nails which are thick headed and thick shanked to withstand blows from 20-, 22- or even 28-ounce hammers. They also use cement-coated sinkers (some believe they go in easier and hold better) and unfinished 8d (2½-inch) nails. Ring shanks provide maximum holding power and can speed construction where building codes permit two of them to replace three common nails. Galvanized or stainless steel nails are used when there's risk of corrosion. Easily removed duplex or double-headed nails are popular for framing scaffolding.



finish

TO nails

roofing

NIZED WITH WASHER

ER SLATER'S

.ESS-STEEL

ESS-STEEL WITH WASHER

DGALVANIZED

.ESS-STEEL HANK

EAD

NIZED WITH HER

ANIZED SHINGLE

TIC-CAPPED

IPPED DALVANIZED TAL CAP

These vary widely in style and design, but if you're lucky you'll never see them again after they're driven. Galvanized asphalt shingle nails are short on length and life span because asphalt shingles are thin and themselves short lived. Among galvanized nails, double hot dipped is the antirust standard. Stainless outlasts all competitors, but on long-lived tile or slate roofs copper is preferred because it is virtually corrosion proof and easier to cut when making repairs. Lead heads are extra long for driving through the high ribs of corrugated metal roofing and the lead helps seal the hole. So do the lead and rubber washers or cushions on nails used on flat metal roofs or flashing. Capped nails have oversize plastic or metal washers to hold down roofing felt.

masonry

⅛" ELECTRD-DALVANIZED STUB

¾" DALVANIZED BMDDTH-SHANK STUB

1⅛" DALVANIZED SPIRAL-FLUTE STUB

1½" STRAIDHT FLUTE

2" SPIRAL FLUTE

All masonry nails are made of hardened steel for driving into "green" concrete, which hasn't set rock hard. (In cured concrete, pilot holes must be drilled first.) A two pound hand sledge is most often used. Masonry nails are brittle and can shatter, so wear goggles.

flooring

1¾" ANNULAR UNDERLAYMENT

2¼" DIL-HARDENED SPIRAL

8d CUT NAIL

Ring shanks pin down the underlayment and spirals fasten the finish flooring when driven diagonally through the tongue (U.S. style) or the groove (French style). Cut nails are meant to be face nailed through wide plank country floors.

box

Ad BRIDHT

4d HDT-DIPPED DALVANIZED BDX

These slender nails are used in cigar boxes, fruit crates and such because they don't split thin wooden slats.

siding

ESS-STEEL

2" GIL-HARDENED

8d HDT-DIPPED GALVANIZED

12d BRIDHT CASING

Ad DALVANIZED

1¼" BRIGHT BRAD

8d ELECTRDGALVANIZED

2½" STAINLESS-STEEL CASIND

12d HDT-DIPPED DALVANIZED CASIND

Finish nails are among the lightweights of construction—and among the last driven—because their job is mainly fastening the moldings and trying to disappear. The vestigial heads are meant to be driven below the surface and puttied over. Tom Silva's tip: If you try to drive them flush, you'll scar the wood. Drive them to head level, then sink them with a nailset." Casing nails are finish nails writ large. They're used for door and window frames and for exterior trim. Some are oil hardened for use with hardwoods. Others are stainless or galvanized to inhibit rust. Bright or unfinished nails are for indoor use only. Smaller finish nails are called brads.

SHINDLE

2½" PAINTI

6d GALVAN

7d SPIRAL

10d DALVA GVAL HEAD

8d GALVAN HARDBDAP

1"

deck

1½" SILICDN-BRDNZE ANNULAR

8d ALUMINUM SPIRAL

16d GALVANIZED SPIRAL

3⅝" DALVANIZED ANNULAR

A¼" STAINLESS-STEEL DDUBLE SPIRAL

Heavy double spirals are used to fasten framing, while lighter ring- and spiral-shank nails lock down planking. Rustproof stainless, bronze or tempered aluminum outperform galvanized. Tom Silva says, "Side nailing planks to metal deck clips means you need never see any nail heads. And your deck will last longer."

wrou

spikes

These supernails, sometimes used by landscapers and timber framers, are 60d (6 inches) or longer. One rnc (20⅞ inches). It has a shank ⅞ inches square and weighs 4.4 pounds.

PHOTOGRAPHS B

SHAKE AND

EO ANNULAR

IZED SHAKE

HARDBOARD

NIZED

IZED
IO

PLASTIC-CAPPED

More like box nails than commons, they're slender and blunt to keep shingles and clapboards from splitting. They're also long and ring shanked to resist plank cupping and warping. Stainless is the choice for redwood and cedar siding because it resists corrosion better than galvanized. Spiral nails are for hardboard siding. Capped or collared nails anchor foam sheathing.

ught

Blacksmiths hammered out these oldest of nails, used to armor doors. Square sectioned and usually square headed, some have diamond heads or large flat panheads the size of quarters.

3½" PYRAMID-HEAD DOOR

nster is 135d

1¼" COPPER

⅞" WIRE

½" ELECTROGALVANIZED WIRE

Antirust coatings allow wider light duty use. And they are light. A pound of 8d common nails contains 106 pieces, but a pound of 8d box nails has 145.

drywall

1½" GALVANIZED

1⅝" BRIGHT

Extra-sharp points speed installation, and ringed shanks resist popping. Some are cement coated, a few are heat treated to a slightly rust resistant blue finish. Many are uncoated.

cut nails

BRAD

BOAT

FLOORING

COMMON

ROSEHEAD CLINCH

WROUGHT HEAD

ROSEHEAD STAINLESS-STEEL DECK

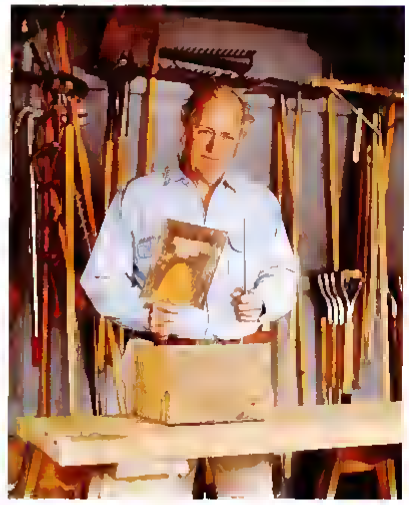
The late 18th century development of nail making machines ended the drudgery of hand forging nails. Cut nails are easily recognized by their blunt points, flat sides and bias cuts that taper on two sides. They are most often used for restorations and wide plank flooring. Rosehead stainless cut nails are also used for decorative effect on decks and siding. Their holding power is excellent until they're loosened—then they slide right out.

Y SPENCER JONES

This Old House

in the garden

uss Morash, executive producer and director of *This Old House*, has worked year-round for 20 years to transform two acres at his Massachusetts home into a showcase garden laboratory. During that time he has had the rare opportunity to try out hundreds of different plants and dozens of garden techniques. Now, in this new section of the magazine, Russ shares what he has learned over almost four decades of passionate gardening, always emphasizing the biggest payoff for the time and money invested. First, he offers a look at a hardy new **petunia** that he tried a year before its commercial introduction this summer (PAGE 100). Then his favorite landscaper, Roger Cook, teaches us how to drive a **mini-dozer** (PAGE 106). And for a finishing touch, Russ demonstrates an **edging** ritual suitable for a king (PAGE 110).



Directory 112 **Resources** 119

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Fantasy petunias are big on bloom even in small nursery packs—a big selling advantage, Goldsmith Seeds' breeder Mary Hunsperger tells Russ. Petunias are the second-best-selling bedding plant in this country, after shade-loving impatiens. Geraniums are third.

RUSS SAYS:

"A lot of novices are rightfully led into gardening by annual bedding plants because they're easy to grow and they have a lot of firepower—impatiens, zinnias, marigolds and now even petunias provide color throughout summer and fall with little or no serious maintenance. Remember that having the right variety can make all the difference between a good plant and an exceptional plant. Try 'Border Beauty' in a zinnia, 'Janie' in a marigold and the 'Super Elfin' series in impatiens—especially the salmon-colored ones."

PERFECT

petunias

The struggle to outfox nature

One day almost a decade ago, Tilly Holtrop, a plant breeder at Goldsmith Seeds in Gilroy, California, found a bag of petunia seeds that had been lying neglected on a storage shelf for years. She decided to grow them.

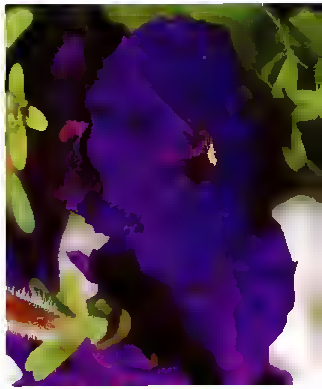
When three of the resulting plants turned out to be weak, straggly and abnormally small, she became intrigued. "I thought it might be a dwarf gene."

Given the boom in container gardening, Holtrop knew a compact version of a popular plant would be very desirable. So she took the next step and crossed seeds from the little plants with a normal line. Sure enough, a fourth of the offspring were dwarf. Suddenly, a few tiny plants began to look like a fortune.

Today, the market-ready descendants of those three dwarf petunia plants fill a Goldsmith greenhouse with row upon row of dazzling color.

The company, which developed a best-selling impatiens called Accent, prospers on its ability to breed new, irresistible flowers. It expects nothing less than a sellout of this new miniature petunia, dubbed Fantasy.

But there is more to this plant than mere size. Until now, petunias came in two main types: grandiflora, with large flowers, and multiflora, with smaller, more abundant blooms. Fantasy is a third type: milliflora, compact and profusely flowering.



Fantasy Blue is purple, but a truer blue is on the way.

The introduction of a new class is all the more remarkable because petunias have been a favorite of home gardeners for so long. In dollar value, says William G. D'Arcy of the Missouri Botanical Garden, they are "the most important ornamental in the world."

Nevertheless, many purists despise petunias as an off-the-shelf, mass-market cliché, and even aficionados concede they have limitations. Petunias get leggy and tend to sprawl. In containers, they flop all over. They don't thrive in hot, humid climes, and in a hard rain the delicate flowers collapse, turning, as Russ Morash says, into "wads of wet Kleenex."

Holtrop thought a dwarf petunia might be without such faults. She turned the project over to Mary Hunsperger, a Goldsmith veteran who had previously developed two lines of dwarf snapdragons. Hunsperger wanted three traits in the new petunia: a neat, rounded shape, an early, predictable bloom

BY JACK McCLINTOCK PHOTOGRAPHS BY KEN PROBST

Birth of a petunia

Deep inside a petunia blossom is all the equipment needed to create seeds. Ordinarily, bright yellow pollen from the anthers (top) fertilizes the stigma at the base of the flower. Plant breeders interrupt this process by removing the anthers so a flower cannot fertilize itself. They then dab an pollen from a different petunia. The resultant harvest of tiny seeds (middle) can retail for $130,000 a pound. Germination rates (bottom) are tested in a laboratory.

Russ compares a traditional petunia, left, with a Fantasy. The standard plant grows up to 18 inches tall and 24 to 36 inches wide. Fantasy grows 10 inches high, 12 to 18 inches wide

(for retail appeal in the pack), and a broad range of colors

She began by crossing the runts with red, white and purple multifloras until she had dwarf plants in seven different colors Then she crossed them with themselves, slowly building up a line of parents for each hue Except for the spontaneous appearance of mutants that make selective breeding possible, genetics is a relatively predictable art If you want red flowers and you know red is dominant in a parent, you cross a red parent with something else—say, a runty mutant—and you'll get a certain number of red runty mutants Cross them with themselves and you'll get even more "I just kept shuffling the deck, recombining genes until I got it," Hunsperger says

Still, she spent four years developing a uniform set of plants, and it took yet another year to produce commercial amounts of seed at the company's facilities in

Fantasy is ideal for small containers and will flourish in a strawberry pot.

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Kenya and Guatemala.

Production of hybrid seed is a complex and delicate operation because the flowers must be pollinated by hand at every generation. If they were left to self-pollinate as they do in nature, many of the bred-in traits (vigor, dwarfism) would disappear.

Fantasy lives up to everything Hunsperger and Holtrop dreamed of. One color, called Pink Morn, is a 1996 All America Selections winner because it performed well in trial gardens across the country. The plant doesn't grow leggy, won't flop open, recovers quickly from a smashing downpour and flourishes in containers.

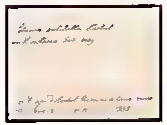
"As we near the millennium," wrote Peter Pashley, garden editor of the *Evening Mail* in Birmingham, England, "it's good to see a new series with a long-term future."

Home gardeners will have to be enterprising to find Fantasy because Goldsmith doesn't sell seeds by the pack. A few will be available by mail through companies such as Park Seed. But nearly all of Goldsmith's supply will be sold to professional growers, who market young plants through mass retailers. By the time they reach garden centers, the Goldsmith name will probably have been lost from the packaging. Buyers should look for the words millifiora and miniature petunia as well as the name Fantasy.

Petunias' Adam and Eve

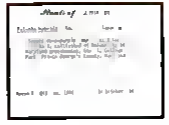
The first thing Europeans wanted to do with petunias after wild ones were discovered in Argentina in the 19th century was cross-breed them. From *Petunia axillaris*, a fragrant species, and *Petunia integrifolia*, a fragrance-free species, Victorians produced a dizzying array of flowers with varying colors, sizes and shapes. All were classified as *Petunia hybrida*, a species that today includes the grandiflora, multiflora and millifiora varieties. Many petunias, once stars of the garden, have disappeared. For example Giant of California, a petunia with pastel-colored flowers seven inches wide, is nowhere to be found. Still other lost varieties, botanists suspect, have simply been renamed. To find out, they search through dried specimens collected long ago that are stored at botanical gardens. The wild petunia varieties shown here are in the collection of the New York Botanical Garden, where they share a cabinet with tobacco plants. Both are members of the nightshade family, which includes tomatoes and potatoes. The name petunia is derived from a Brazilian aboriginal word for tobacco.

PURPLE PARENT
Petunia integrifolia
Grows wild in Argentina.



WHITE PARENT
Petunia axillaris
Grows wild in Brazil, Argentina and Uruguay.

OFFSPRING
Petunia hybrida
Includes virtually all garden petunias.



PHOTOGRAPHS BY ALISON RIEA

See Directory, on page 119, for details and sources.

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wheee-ha!

Hey, this thing isn't so hard to drive after all, but watch out for the house... and the trees, and the grass...

BY WILLIAM G. SCHELLER
PHOTOGRAPHS BY ANDREW KAUFMAN

A story in a second grade reader, "Mr. Hurry Changes Things," tells of a fellow who got tired of climbing the hill between his house and barn every day and borrowed a bulldozer to level the terrain. The ensuing havoc hammers home the moral that Mr. Hurry should have left well enough alone, but it's possible to sympathize with him. Who wouldn't like a big machine to take care of all the heavy duty yard work at once?

One should have enough respect for the lessons of second grade not to try to get hold of a bulldozer, but happily there is a miniature, layman friendly earth-mover called the Bobcat. By renting one for about $150 a day, plus attachments and delivery, weekend landscapers can play Mr. Hurry on their own turf.

I got my first a chance to try one in south Florida with *This Old House* landscaper Roger Cook, who owns three Bobcat models. Our test track: a property near Miami littered with construction and yard debris and in need of a few holes dug for posts and plantings. Our test vehicle: a midsize Model 773 powered by a four-cylinder, 46 horsepower Kubota diesel engine.

Bobcat is one of several brands of skid-steer machines, powered by separate hydraulic drives on each side. They work like tanks. Instead of a steering wheel, there are levers on either side of the cabin. Push both forward, you go forward, pull them back, you go in reverse. Push one forward and pull the other back, you spin in place. To stop, just let go (there are no brakes).

Things get trickier with the pivoting foot pedals that control the lift arm and bucket. Toeing down on the left pedal lowers the lift arm, rocking back on the heel raises it. On the right, toe-down dumps the bucket, heel back scoops. Smooth operation requires instant recall of which does what, not to mention the ability to pat your head while rubbing your tummy.

You sit high up, securely caged and belted behind a lap bar that must be snapped down firmly or the machine won't operate. Thus cued to safety, the first thing I did was throttle down. But as I eased the levers forward, the Bobcat lurched down the lane like a mule cart with square wheels. My excess caution with the throttle was the problem, according to Bobcat of Miami's Tom Karpinski. "The throttle doesn't control speed," he said. "It controls the hydraulic pressure powering the wheels." Insufficient pressure causes the bucking.

Once I cranked the throttle back up, the Bobcat was a snap to drive. Within minutes, I was snaking the 5,400 pound, 66-inch wide vehicle around parked vans and pickups with little effort. I even launched into a 360, which is as close as you can get to a pirouette with a piece of heavy machinery. On grass, though, Roger suggested more finesse. Skid-steering through tight turns is death to sod. Better to make 3-, 5-, or 10-point turns, he advised.

Coordinating lift arm and bucket was another matter. An expert approaches a sandpile with bucket at ground level, then deftly scoops, tilts the bucket and raises it in one graceful motion, all the while backing away to dump the load. A novice stops, tilts the bucket forward (which foot was that again?), advances into the pile, stops again, tilts back the mere half-bucket of sand he's managed to collect, lifts the bucket and, after more stopping and fiddling, heads off on his humbled way. It's a bit like trying to use a shovel

Hydraulic drives on each side allow these earth-movers to thread nimbly among obstacles that might stymie bigger machines.

RUSS SAYS:
"Small earth-moving equipment like the Bobcat solves the problem of getting a machine into tight places. We recently used two of these critters to put in 10,000 square feet of new lawn. They rototilled, moved dump-truck loads of soil and raked it out smooth without any hand labor. We were done in 2½ hours. That's their advantage. Little wonder they've become ubiquitous tools for landscape contractors."

A gentle tap against the right foot pedal, and the loader tips a bucketful of sand. This brawny skid-steer machine, fitted with its wide array of hydraulically operated accessories, mops up construction and landscape chores in a twinkling.

Auger at the ready, the Bobcat is poised to start work on a posthole. Foot-pedal pressure sets the bit against the ground; a thumb switch lets the operator rotate the auger in either direction.

by giving each muscle separate instructions.

I got the hang of it—eventually—but it was nice to switch from sandpile to brush pile, where I could leave the bucket in place and just skate the debris ahead of me.

One thing I didn't have to think about in Florida, but a real concern elsewhere, is negotiating hills. Bobcats have 70 percent of their weight over the rear wheels and 30 percent over the front when the bucket is empty. When it's full, those numbers are reversed. Whichever end is heaviest should be pointed straight uphill, ideally on no more than an 11-degree incline. Crossing a slope sideways invites tipping.

"Your best bet is to go at an angle," says Marty Millet of the Melroe Co., Bobcat's manufacturer. "That way, if you're about to tip, you can get out of trouble by turning uphill."

After mastering the bucket, it was time to give the auger a workout. All Bobcat accessories—augers, tillers, backhoes, pallet forks, graders, rakes, breakers (massive jackhammers), trench diggers, snowblowers—are secured by a pair of levers. Coupling and uncoupling are one-man operations, even though most accessories are too heavy to lift. You simply drive up to the attachment and snap the levers in place by hand.

Operating the six-inch auger was easy. At the first fencepost site, I centered the shaft over ground zero, lowered the lift arm and pressed a thumb switch on the left hand lever to start the big drill turning. About 10 inches below the surface the auger hit coral rock, the bones of south Florida. So I eased my left toe forward, putting more force behind the bit. Within 15 or 20 minutes, it was down to its full four-foot depth, and white coral nuggets were heaped neatly around the hole. Try that with a posthole digger. If the auger hits a rock it can't bore through; a relief valve will sense the resistance and stop the machine before damage occurs.

At the end of the day, Roger and I left a small cornet of Florida much tidier and neatly perforated with some nice new postholes. I hadn't moved any hills, but I felt Mr. Hurry would have been proud of me.

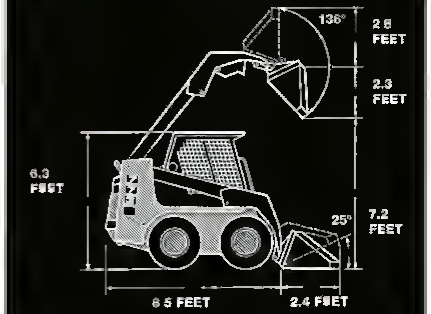
RENTING A DOZER

Renting a skid-steer loader is actually less difficult than renting a car. Some states don't even require a driver's license (but you must keep off public roads). Many rental agents will demonstrate the machine for you, and some have a basic instructional video. When renting by phone, ask whether the delivery driver is authorized to provide instructions. Ask also about the particulars. The agency may charge delivery mileage, and the day rate may limit the hours of operation for each 24-hour period (a rented machine usually comes with a full 14-gallon tank of diesel fuel, enough for about nine hours). Finally, find out whether your insurance or the agency's covers liability. Melroe Co. of Fargo, North Dakota, sells a skid-steer loader operator training course that includes a video and classroom-type materials. Designed for professionals, it costs $150 and, appropriately, leaves no stone unturned.

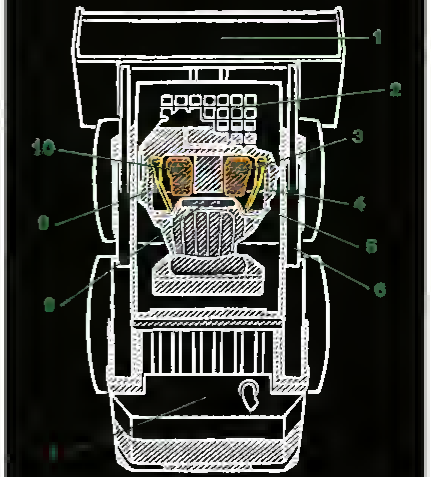
See Directory, on page 112, for details and sources.

Go cat, go

Load a Bobcat's bucket with 15.2 cubic feet of dirt—up to 1,700 pounds—and the little mite can lift it 9½ feet off the ground. Below are the specs for Model 773.



1. Bucket
2. Safety cage
3. Right pedal (tilts forward to empty bucket, backward to scoop)
4. Right lever (controls speed and direction of right wheels)
5. Throttle
6. Lift arm
7. Diesel engine
8. Lap bar (machine won't operate until it's in place)
9. Left lever (controls speed and direction of left wheels)
10. Left pedal (tilts forward to lower lift arm, backward to raise)



ILLUSTRATIONS BY CLANCY GIBSON

Russ says, "Nothing so adds sharpness to the garden as defining the grass this way."

CRISP AND PROPER

edging

A simple technique with a garden spade transforms the landscape

Manners always matte
bot they're especially important on the frontier between two cultures
Even in that most peaceful of settings, the garden, territorial ambitron
can encroach on civil relations

Keeping peace between, say, the lawn and a bed of pansies isn't alway
easy "Living plants grow," says Jim Brooks of the Lawn Institute in Ma
etta, Georgia "They move."

Which is why Russ Morash stepped into this green oasis with his garden hose, wheelbarrow and trusty flat-bladed, straight-edged garden spade to show us how the job is done

Instead of spading, some gardeners insist on using a physical barrier, o
which there are many: brick, wood, stones, rows of conch shells, bare earth. Of the plastic edging that comes in a roll, Russ complains, "It looks like plastic." But there are neat-enough metal edges of aluminum or steel

In subtropical Miami, where grass grows like a weed, Don Evans, director of horticulture at Fairchild Tropical Gardens, doesn't care much for "structural edges" either. But because Fairchild doesn't have them, his crew has to use gas-powered edgers to keep St. Augustine grass from sneaking up over miles of pathways, flower beds, display plots and gravel parking areas. In spots where looks are less crucial than ease of maintenance, concrete may be used. "Hard edging," Russ calls it unsympathetically. "You'd never use it in a proper garden. Too visually aggressive."

From this you get an idea of his taste about edging: clean, genteel, classical. What he's doing here, with garden hose and spade, is his own pet form of the art. It's called "cut edging." He describes it as "a classic English garden technique to define one area from another. In all the great gardens of England, this is what they'd do."

And then, because it takes an edge to make an edge, he picks up a file and, with long, smooth strokes, begins sharpening his spade, preparing to attack the border

The grass in this garden, a mix of perennial rye and red fescue, has advanced much too close to the pansies. So Russ deploys his hose as a flexible cutting guide, stringing it out along the bed's new edge. Spading along this line will create a new aesthetic focal point: the crisply cut turf line, a V-shaped trench like a moat, then a rise to the bed itself, all sweeping along in an eye-arresting Hogarthian curve

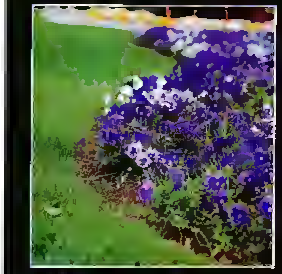
When he started, Russ wasn't entirely happy with this pansy bed. He likes flower beds six or eight inches above grade, and this one was only an inch or two up. But as he edged, he tossed the soil back among the flowers, knowing that eventually the bed would rise. He worked painstakingly, finishing perhaps a foot per minute

"Take your time and you'll get there faster," Russ's father used to say
In half an hour, he was packing up his tools

BY JACK McCLINTOCK PHOTOGRAPHS BY KEN PROBST

See Directory, on page 112, for details and sources

The process



The lawn is creeping into the pansy bed (top), so Russ prepares to separate the two. To hone his spade, he strokes a mill bastard file against the back of the cutting edge (middle), applying pressure only on the forward stroke. Then he leaps onto the spade (bottom). He tips the spade back, then pulls it out. After he has loosened a few feet, he turns the spade 90 degrees and cuts the turf into chunks he can easily remove.

Directory

A listing of goods and services

OFF THE WALL *pp. 13-14*

Home Free Pet Containment Systems, #HF200, for an area up to 5 acres and a pet 5-50 lbs, $230, *Innotek Pet Products Inc, One Innoway, Garrett, IN 46738, 219 357 3148.*

WGBH Educational Foundation does not endorse any product or service mentioned or advertised in this magazine.

Prices shown are manufacturers' suggested retail prices at press time, or the amount *This Old House* actually paid at retail. Prices, product numbers and availability may change at any time.

EXTRAS *pp. 16-23*

p. 16—**Headlamps:** Adjustable focus Micro #E03, $28.50, made in France by Petzl Intl. and distributed in the U.S. by *PMI, 4466 Highway 27 North, Lafayette, GA 30728; 800-282-7673.* **Polypropylene case:** Headlite #HLX, $22.50, *Stewart Browne Manufacturing Co., 1165 Hightower Trail, Atlanta, GA 30350, 770-993-9600.* **Side-mounting Jakstrap:** $6.95, *Liston Concepts Inc., 2099 W. 2200 South, Salt Lake City, UT 84119, 800-221-8500.* **Krypton bulb:** Omnilite #14KBV, $12.20, *Fulton Industries Inc., 135 E. Lmfoot St., Wauseon, OH 43567; 800-537-5012.* **Belt pack Zoom Adaptateur,** with built-in AA battery adaptor, #E04 ADP, $40.75, made in France by Petzl Intl. and distributed in the U.S. by *PMI, 4466 Highway 27 North, Lafayette, GA 30728, 800 282 7673.* **Xenon bulb:** VersaBrite #2250, $20.95, *Pelican Products Inc., Torrance, CA 90505, 800 473 5422.*

p. 17—**Garage location:** *Housing By Lifestyle,* by James W. Wentling, 1994, 192 pp., $39.95, *McGraw-Hill Co., 1221 Avenue of the Americas, New York, NY 10020, 800 338 3987 or 800-722-4726.* "1995 Home Buyers Preference Survey," $100 (members), $125 (nonmembers), *National Association of Home Builders, 1201 15th Street NW, Washington, DC 20005, 800-223-2665.* **Tree planting:** "Social Benefits of Resident Involvement in Tree Planting: Comparison with Developer Planted Trees," *Journal of Arboriculture,* Nov. 1994, pp. 323-328, *217-355-9411.* **Sacramento Tree Foundation:** *201 Lathrop Way, Suite F, Sacramento, CA 95815, 916-924-8733,* for information on local programs, call the **Alliance for Community Trees,** located at the same address, *800 228 8836.* **New York City Tree Trust:** $450 per new tree planted, plus a possible $200 for excavating old tree or roots (tax deductible), *212 360-3733.*

p. 18—**Ductwork:** Spirosafe duct systems, *Lindab, 2 Stamford Landing, Stamford, CT 06902, 203 325-4666.* **Flame-Out (Flame-No-More) towel:** $9.12, *CareChem Corp., Box 46045, Raleigh, NC 27620, 800 948 6170.* **Junk House!** *Strange Sites: Uncommon Homes & Gardens of the Pacific North west,* by Jim Christy, 1966, 96 pp., $24.95, *Harbour Publishing, Box 219, Madeira Park, BC, Canada V0N 2H0; 604-883-2730.* **Tefoc Brick Building Kits:** #512 with 238 pieces, $50; extension kits, $10-$24 depending on quantity, manufactured in Spain and distributed in the U.S. by *Feeleman/McLaughlin Enterprises, 4153 S. Third West, Murray, UT 84107, 800-779-2205.*

p. 19—**Woodworkers Club:** *216 Dominion Rd. NE, Vienna, VA 22180; 703-255-1044; and 5471 N. Dixie Highway, Boca Raton, FL 33487, 407-995-6790.* **Paint:** *Paint Recipes: A Step by Step Guide to Colors and Finishes for the Home,* by Liz Wagstaff, 1996, 192 pp., $19.95, *Chronicle Books, 275 Fifth St., San Francisco, CA 94103, 800-722-6657.* **Tool Belt:** large $74.95, X-large, $74.95, XX-large, $78.25, *Seatek, 392 Pacific St., Stamford, CT 06902, 203-324-0067.* **Super Square:** Trigger-lock combination-square head, #PN CS10100 and #PN SC10-036, $150, set with protractor head, combination square and cast connectors, $500, 36-in. unscaled bar #PN SE10-036, $31.20, 60-in. unscaled bar #PN SE10-060, $51.50; *Super Square Corp., Box 636, Beacon, NY 12508, 800 823 5344.*

p. 22—**Anthracite coal:** $5.56 per 50-lb. bag, *Blaschak Coal Corp., Box 12, Mahanoy City, PA 17948, 800-553-3117.* **For more information:** Hearth Products Association, *1601 N. Kent St., Suite 1001, Arlington, VA 22209, 703-522-0086.* **Gossage 3rde Strike Hammers:** $25-$30, *3771 Porter Creek Rd., Santa Rosa, CA 95404, 800 784-8850 or 707 578-8558.*

p. 23—**Mflibar V220:** $911 per 70-m roll, *New Necessities, 5710 Pebblebrook Trail, Gainesville, GA 30506, 770-844-9438.* **Usonian House:** Taliesin Preservation Commission, *Box 399, Spring Green, WI 53588, 608 588 7900.* **Further reading:** *The Architecture of Frank Lloyd Wright: A Complete Catalog,* by William Allin Storrer, 2nd ed., 1992, 433 pp., $19.95, *MIT Press, 55 Harvard St., Cambridge, MA 02142, 800-356-0343. The Architecture of Frank Lloyd Wright Companion,* by William Allin Storrer, 1993, 508 pp., $85, *University of Chicago Press, 11030 S. Langley Ave., Chicago, IL 60628, 800-621-2736.* **Our thanks to:** Dick Carney, chairman, *Frank Lloyd Wright Foundation, Taliesin West, 12621 N. Frank Lloyd Wright Blvd., Scottsdale, AZ 85261, 602-860-2700;* Jirh Aulrk, director, *Taliesin Preservation Commission.*

Marine varnish: Schreuder Marine Yacht Varnish, $24 for .75 liter, $70 for 2.5 liters, imported from the Netherlands exclusively by *Fmo Paints of Europe, Box 419, Route 4 West, Woodstock, VT 05091, 800 332-1556.* **Further reading:** *Understanding Wood Finishing,* by Bob Flexner, 1994, 320 pp., $27.95, *Rodale Press, 33 East Minor St., Emmaus, PA 18098, 800 848 4735.*

GLASS TILES *pp. 25-29*

Bedrock tiles: $19 per sq. ft., *Bedrock Industries, 620 North 85th St., Seattle, WA 98103, 206 781 7025;* distributed exclusively by *Pratt & Larson Tile Inc., 1201 SE Third Ave., Portland, OR 97214, 503-231-9464, and 207 Second Ave. South, Seattle, WA 98104, 206 343 7907.* **Oceanside tiles:** Oceania series, 3"x3" blue field, $1.20 each, 6'x6" blue diamond spiral, $9.45 each, 4"x4' rainbow X tile, $5.25 each, distributed exclusively by *Walker & Zanger, 8901 Bradley Ave., Sun Valley, CA 91352, 818 504-0235.* **Tessera hand-cut mosaic,** $24 per sq. ft., *Oceanside Glasstile Co., 3235 Tyler St., Carlsbad, CA 92008, 619 434-0051.* **Toltec tile:** 6"x6" spiral, $14.95 each, *Toltec Architectural Glass, 3901 W. Jefferson Blvd., Los Angeles, CA 90016, 213 732-7654; distributed by Walker & Zanger.*

BLOCK PLANE *pp. 31-34*

Block plane: Stanley No. 60½, #17W42, $47.50, *Woodcraft, 210 Wood County Industrial Park, Box 1686, Parkersburg, WV 26102 1686, 800-225 1153.* **Vise-Type Honing Guide** (rolling jig), #60M07 01, $12.95; *Lee Valley Tools Ltd., 12 East River Street, Ogdensburg, NY 13669, 800-871-8158.* **Diamond whet stone:** 6"x2" bench model fine grit, $43.50, *DMT Inc., Hayes Memorial Dr., Marlborough, MA 01752, 508-481 5944.* **Further reading:** *Measure Twice, Cut Once: Lessons From a Master Carpenter,* by Norm Abram, 1996, 208 pp., $17.95, *Little, Brown & Co., 34 Beacon St., Boston, MA 02108, 800-759-0190.*

POWER PAINTING *pp. 36-40*

HVLP sprayers: LX-50C with pro gun and paint cup, $645, LX-95A with pro gun and paint pot, $1,795; *Lex are Products Inc., 34-2 Sullivan Rd., N. Billerica, MA 01862, 800-676-7303.* **Airless power roller:** R10 #0152909, $223, *Wagner Spray Tech, 1770 Fernbrook Lane, Minneapolis, MN 55447, 800 443 4500.* **Latex paint thinner:** Floetrol, $14.42 per gal., *The Flood Co., 1212 Barlow Rd., Box 2535, Hudson, OH 44236-0035, 800-321-3444.* **Cabinet paint:** Schreuder Hascolac #1002 and #1088, $24 per qt., imported from the Netherlands by *Fmo Paints of Europe, Box 419, Route 4 West, Woodstock, VT 05091; 800-332-1556.* **Our thanks to:** James and Laura Medoff, Concord, MA.

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HOMEOWNER'S INSURANCE *pp. 43-44*

For more information: "Homeowner's Insurance," *Consumer Reports*, October 1993, pp. 627-635. Free booklets: "The Consumer's Independent Guide to Homeowners Insurance", *Independent Insurance Agents of America, 127 S. Peyton St., Alexandria, VA 22314, 800-991 7722*; and "Twelve Ways to Lower Your Homeowners Insurance Cost", *Dept. 12, Insurance Information Institute, 110 Wilham St., New York, NY 10038 (enclose a self-addressed stamped envelope), 212 669 9250*

HANGING A DOOR *pp. 47-49*

Biscuit joiner: DeWalt #DW682K, $230. *Black & Decker, Box 618 Hampstead, MD 21074, 800 762 6672* Cordless drill: Magnaquench #PO 9853S, $305, *Porter Cable, Box 2468, 4825 Highway 45 North, Jackson, TN 38302 2468, 901 668 8600* One-inch bevel edge bench chisel: Marples #M-4441, $11 36, *Record Tools Inc., 1920 Clements Rd., Pickering, Ontario, L1W 3V6, Canada, 905-426 1077*

GROUND SOURCE HEAT PUMP *pp. 52-59*

For more information: International Ground Source Heat Pump Association (IGSHPA), *Oklahoma State University, 490 Cordell South, Stillwater, OK 74078-8018, 800 626-4747* Geothermal Heat Pump Consortium, *701 Pennsylvania Ave NW, Washington, DC 20004, 202 508 5500 or 888-333 4472* Our thanks to: Sacramento Municipal Utility District, *Box 15830, Sacramento, CA 95852 1830, 916 732 5591* Terry Proffer, Earth Energy of Colorado, *436 E. Main, Box 3266, Montrose, CO 81402-3266, 970 240 8332* Greg Schillanskey, All Year Heating and Air Conditioning, *801 Plaza Ave., Sacramento, CA 95815, 916 922-7796* Paul Bony, Plumas Sierra Rural Electric Cooperative, *73233 Highway 70, Portola, CA 96122, 916 832-4261* Lawrence Marchiniak, March Equipment Company, *8930 Osage Ave. Sacramento, CA 95828, 916 381-8308* White Sulphur Springs Ranch Bed & Breakfast, *Box 136, Cho, CA 96106, 800 854 1797 or 916 836 2387* Proctor Engineering Group, *818 Fifth Ave., Suite 208, San Rafael, CA 94901, 415-455-5700*

AMERICAN CRAFTSMAN *pp. 60-65*

M. C. Seward Cabinetmaker; *RR1 Box 34D, Manifold School Road, New Park, PA 17352, 800-993 9040* The Main St. Gallery; *109 Main St., Annapolis, MD 21401, 410-280-2787* Further reading: *A Cabinetmaker's Notebook*, by James Krenov, 1991, 136 pp. $14.95, *Sterling Publishing Co Inc., New York, 800-848 1186.*

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ULTIMATE SINK *pp. 66-73*

Composite 1½ bowl Astorite #KADC 2233, $424, *Kindred Industries, 1000 Kindred Rd., Midland, Ontario L4R 4K9, Canada, 800-465-5586* Hammered brass single bowl Hammertone #CS450, $565, *Bates & Bates, 3699 Industry Ave., Lakewood, CA 90712, 800 726 7680* Stainless steel double bowl Prestige Plus #PRX 660, $765, *Franke Inc., Kitchen Systems Division, 212 Church Rd., North Wales, PA 19454, 800 626-5771* Americast double bowl #7145, $309 $417, *American Standard Inc., 605 S. Ellsworth Ave., Salem, OH 44460, 800 524-9797* Black fireclay medium square #20293, $290, disposal bowl #L20294, $204, chrome wire basket #L31007, $100, *Kallista, 2701 Merced St., San Leandro, CA 94577, 510 895-6400* White fireclay single bowl with decorated apron Interlace Alcott #K14571 FC, $1,358, *Kohler Company, Kohler, WI 53044, 800 456 4537* Solid-surface double bowl with drainboard, Swanstone EuroKitchen #KSEU 3020, plastic colander included, $430, *The Swan Corporation, One City Centre, St. Louis, MO 63101, 314 231 8148* Solid surface double bowl WilsonArt Gibraltar #BD 323, $525, *WilsonArt International, 2400 Wilson Place, Box 6110, Temple, TX 76501, 800-433-3222* Soapstone single bowl with backsplash, custom built, $800 $1,200, *Vermont Soapstone Co., Box 168, Stoughton Pond Rd., Perkinsville, VT 05151, 802-263-5404* White Vikrell Waterstone Workstation #CV3322DBG, $250-$300; *Sterling Plumbing Group 2900 Gulf Rd., Rolling Meadows, IL 60008, 800 895-4774* Stainless steel double bowl Ravinia #K3224, $588.90 pictured with hard wood cutting board #K3280, $58.55, and coated wire basket #K3280, $63.55, *Kohler Company, Kohler, WI 53044, 800-456 4537* Our thanks to: Sheldon Slate Products, *N. Guildford Rd., Monson, ME 04464, 207 997 3615* Klaff's, *28 Washington St., S. Norwalk, CT 06856, 203-866-1603* Kitchens By Deane, *1267 E. Main St., Stamford, CT 06902, 203-327 7008*

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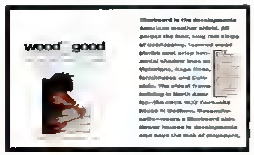
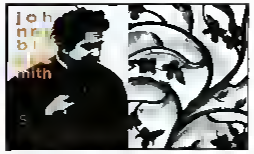
WOOD FOR GOOD *pp. 74-79*



Factory primed cedar siding: 6 in. clear vertical-grain, 66 cents per lineal ft.; *MacMillan-Bloedel, 925 West Georgia St., Vancouver, BC V6C 3L2; 604-582 2690.* 1¼" 5d stainless-steel siding nails: $99 for 25 lbs., *Prudential Building Materials, 71 Milton Street, East Dedham, MA 02026, 617-329-3232.* Acrylic latex caulk with silicone: Alex Plus, $1.99 per cartridge, *DAP, Box 277, Dayton, OH 45401, 800-327-3339.* Olefin housewrap: Tyvek HomeWrap, $165 per 9' by 195' roll, *DuPont Co., 107 Market Street, Wilmington, DE 19898, 302-774-1000.* For more information: Western Red Cedar Lumber Association, *1100-555 Burrard St., Vancouver, BC V7X 1S7; 604-684-0266.* Western Wood Products Association, *Yeon Building, 522 SW Fifth Ave., Portland, OR 97204, 503-224-3930.* Our thanks to: Tom Jester, architectural historian, *Heritage Preservation Services, National Park Service, 800 N. Capitol St., Washington, DC 20002, 202-343-9578.* Arlington Coal & Lumber, *41 Park Ave., Arlington, MA 02174; 617-643-8100.*

JOHNNY BLACKSMITH *pp. 80-87*



Blacksmith: John Boyd Smith, *Smith Forge, 315 East 51st St., Savannah, GA 31405, 912-234-2651.* Wrought iron: Tom Ryan, U.S. representative, *The Real Wrought Iron Company Ltd. of UK, (in association with The Ironbridge Gorge Museum Trust), 58 Wyman Street, Arlington, MA 02174, 617-643-0158.* Further reading: *Blacksmith Journal, Box 193, Washington, MO 63090, 314-239-7049. Ornamental Ironwork: An Illustrated Guide to Its Design, History, and Use in American Architecture,* by Susan and Michael Southworth, 1992, 224 pp., $29.95; *McGraw-Hill Co., New York, 800-722-4726.*

SERIOUS SHUTTERS *pp. 88-91*

Custom shutters: Cobblestone Mill Woodworks Inc., *802 Tom Charles Lane, Canton, GA 30115; 800-591-4597 or 770-345-5612.* Period design consultant: Reneau de Beauchamp, *1 Depot St., Suite 305, Marietta GA 30060-1909; 770-419-9668.* Further Reading: *A Field Guide to American Houses,* by Virginia & Lee McAlester, 1984, 525 pp., $21.95; *Alfred A. Knopf, New York; 800-726-0600.*

NANTUCKET PREVIEW *pp. 92-93*

Further reading: *Nantucket Style,* by Leslie Linsley, 1990, 228 pp., (out of print); *Rizzoli International Publications, New York, 800-522-6657. Nantucket Gardens and Houses,* by Taylor Lewis, 1990, 230 pp., $50; *Little Brown & Co., Boston, 800-759-0190. Nantucket: Then and Now,* by John W. McCalley, 1981, 164 pp., $13.95; *Dover Publications Inc., Mineola, NY, 516-294-7000.*

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NAILS *pp. 94-96*

Nails are usually sold by the pound in prices that vary according to type, size and material; they are available from home centers, hardware stores and building catalogs. The following companies supplied the nails depicted on our pullout chart: Clendenin Bros., Inc., *4309 Erdman Ave., Baltimore, MD 21213, 410-327-4500.* Dickson Weather-proof Nail Co., *Box 590, Evanston, IL 60204, 847-864-2060.* Georgia Pacific Corp., *133 Peachtree St., Atlanta, GA 30303, 800-284-5347.* Manasquan Premium Fasteners, *Box 669, Allenwood, NJ 08720; 800-542-1979.* Maze Nails, *100 Church St., Peru, IL 61354, 815-223-8290.* Mazel & Co., *4300 W. Ferdinand St., Chicago, IL 60624, 312-533-1600.* Parker Kalon Fasteners, *510 River Rd., Shelton, CT 06484, 203-944-1711.* Parker Metal Corp., *Box 15052, Worcester, MA 01615; 800-225-9011 or 800-523-3002 (in MA).* Perma Grip Fasteners, *3375 N. Service Rd., Burlington, Ontario, Unit C-4, Canada L7N 3G2, 905-336-9400.* PrimeSource Inc., *1800 John Connally Dr., Carrollton, TX 75006, 214-417-3754.* Swan Secure Products Inc., *7525 Perryman Ct., Baltimore, MD 21226, 410-360-9100.* Tower Manufacturing Co., *1001 W. Second St., Madison, IN 47250, 812-265-4823.* Tremont Nail Co., *8 Elm St., Wareham, MA 02571; 508-295-0038.* Wheeling Corrugating Co. (La Belle), *134 Market St., Wheeling, WV 26003, 304-234-2400.* Wrought iron nails by special order: Woodbury Blacksmith and Forge Co., *161 Main St., Box 268, Woodbury, CT 06798, 203-263-5737.* Village Blacksmith Shop, *221 North St., Goshen, CT 06756, 860-491-2371.* Further reading: "Wood Decks: Materials, Construction, and Finishing," U.S. Forest Products Laboratory, 1996, 102 pp., $19.95; *Forest Products Society, 2801 Marshall Ct., Madison, WI 53705; 608-231-1361.* Our thanks to: Peter Ross, *Anderson Blacksmith Shop,* Colonial Williamsburg Foundation, *Box 1776, Williamsburg, VA 23187; 804-220-7527.* Sammy's, *484 Broome St., New York, NY 10013, 212-343-2357.* Joseph Loferski, *Virginia Polytechnic Institute and State University, Department of Wood Science and Forest Products, Blacksburg, VA 24061, 540-231-4405.*

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PETUNIAS *pp. 100-104*

Goldsmith Seeds does not sell to the public, only to seed companies and the bedding plant industry. Visitor tours available (guided tours for 10 or more by appointment), dawn to dusk, seven days a week, *Goldsmith Seeds, 2280 Hecker Pass Highway, Gilroy, CA 95020, 408-847-7333* Plants: Petunia Fantasy Mix, B 25403, $29.95 for tray of 58 plants (seasonal), *Burpee, 300 Park Ave., Warminster, PA 18991-0001, 800-888-1447* Seeds: 50 seed packet in individual colors, $1.80, 30-seed Fantasy Mix packet free with order of $10 or more, *Park Seed, Cokesbury Road, Greenwood, SC 29647-0001, 800-845-3369 or 864-223-7333*

BOBCAT *pp. 106-109*

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EDGING *pp. 110-111*

For more information: *Victory Garden Landscape Guide*, by Tom Wirth, 1984, 360 pp., $24.95, *Little, Brown & Co., Boston, 800-759-0190*. The Lawn Institute, *1509 NE Johnson Terry Rd., Marietta, GA 30062, 404-977-5492*. Fairchild Tropical Gardens, *10901 Old Cutler Rd., Miami, FL 33156, 305-667-1651*

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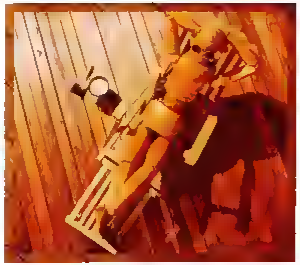

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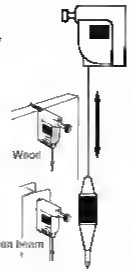

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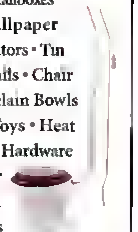

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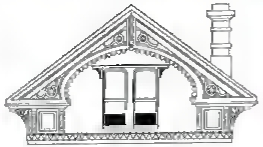

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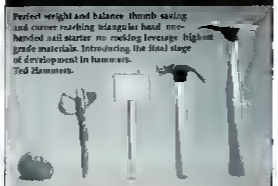

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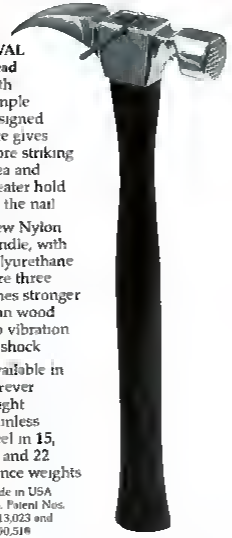

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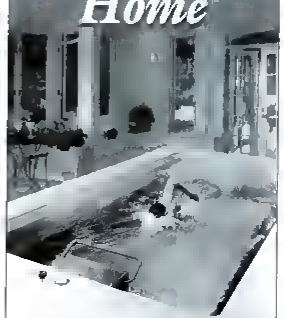

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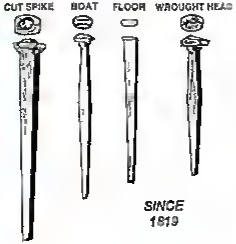

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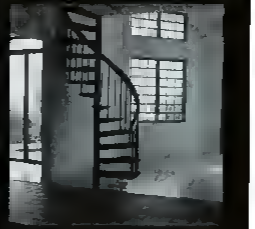

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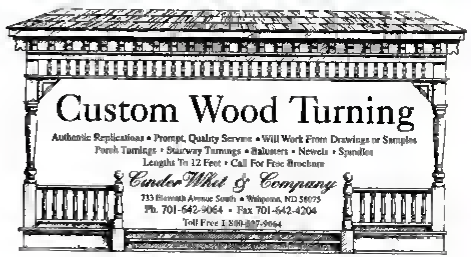

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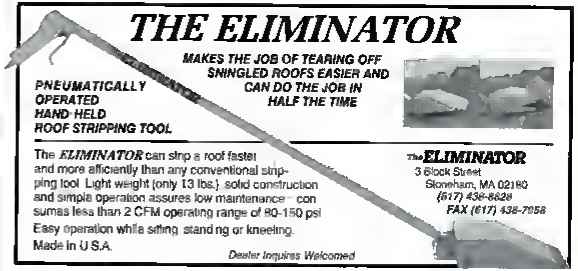

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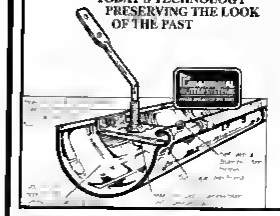

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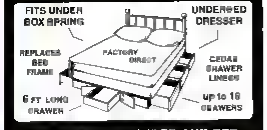

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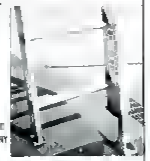

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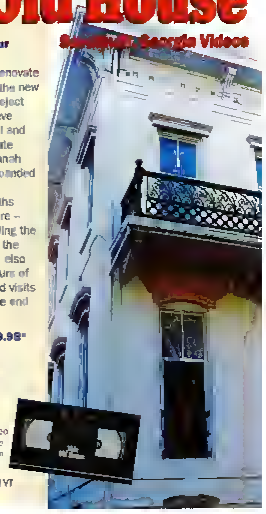

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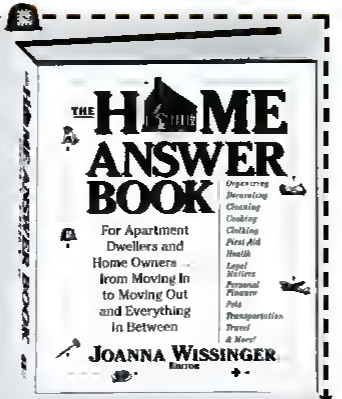

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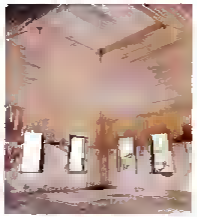

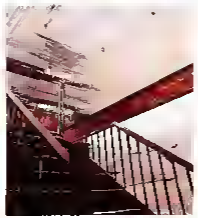

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helps you do things right

*Overstrike test conducted by striking hammer handle against metal object. ©1998 The Stanley Works.

With the new Dodge Caravan's optional driver-side sliding door, you can spend less time running around.

Caravan gives you the safety of standard dual airbags. And for extra peace of mind, you can opt for four-wheel anti-lock brakes.

The new Caravan offers you up to 14 places to set a cup of coffee, a can of pop or a juice box. Even Big Gulps.®

Our new Easy Out Roller Seats™ have landing gear-type wheels that pop down, so taking them in and out is a lot easier.

Motor Trend *Car of the Year*

For the first time ever, the Motor Trend Car of the Year is more than a car. It's a Caravan. For all of us at Dodge, that's quite an honor.

Ultra high-strength steel door beams and front and rear crumple zones are part of the new Caravan's energy management system, which helps protect occupants from the force of an impact. No wonder Caravan exceeds 1998 car safety standards.†

Just as original as the original.™

The new Dodge Caravan is backed by our Customer One Care™ 3-year or 36,000-mile bumper-to-bumper warranty and 3/36 Roadside Assistance.* For still more information, call 1-800-4-A-DODGE or visit our Web site at http://www.4adodge.com

Grand Caravan LE

Always wear your seat belt.

*See limited warranty & restrictions at your dealer. Excludes normal maintenance & wear items. †Excludes sunscreen glass.

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The New Dodge Caravan